

*O. W. Spaulding*

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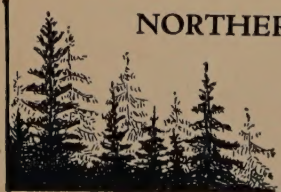
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# JOURNAL of FORESTRY

OFFICIAL ORGAN OF THE SOCIETY OF AMERICAN FORESTERS

A professional journal devoted to all branches of forestry

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# JOURNAL OF FORESTRY

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## EDITORIAL

### PERMISSIVE SELF HELP FOR THE LUMBER INDUSTRY

IN RECENT years many industries have regularly pleaded for a changed governmental attitude toward coöperation in business. Most prominent are the natural-resource industries, particularly coal, petroleum and lumber. Their pleas range from a temporary suspension of certain provisions of the anti-trust laws to their repeal in full. All want governmental sanction to control overproduction and to stabilize prices. Such control and stabilization is certainly desirable. Really it is urgently needed. It is becoming more and more evident that unrestricted competition in developing natural resources is actually injurious to their conservation or wise use and, therefore, contrary to the best interests of the public. It is as true of timber as it is of coal and petroleum. At one time the United States had a super-abundance of virgin timber and there was almost as frenzied an effort on the part of the government to give it away to stimulate its development as there was intense competition among individuals to get it and convert it as quickly as possible into marketable products. The natural result was wasteful exploitation. The wastefulness would have been even greater had it not been for the phenomenal industrial growth of the country and the concomitant huge demand for lumber. It

was the large supply of virgin timber that made the lumber industry great; timber of second-growth characteristics could not have done it so successfully. Now our supply of virgin timber is so reduced that we cannot afford to continue depleting it with such haste and waste. It must be conserved through wiser and more complete conversion and only as it is needed and any pressure that forces a contrary policy must be relieved—by private endeavor if possible. If private initiative is impotent to accomplish it, the government must give it the necessary strength. If what is left of the virgin timber is developed sanely and conservatively it can be made to last easily twice its present predicted life, and those grades of lumber and products obtainable only from virgin timber will be available to several additional generations. Too much of our legislation and research has been directed toward the production of second growth; too little has been aimed at lengthening the life of our remaining virgin growth.

In a recent address, Dr. Wilson Comp-ton, the lumber industry's most able spokesman, made a powerful plea for modification of the anti-trust laws. It seems so reasonable that it merits serious consideration from Congress. Chronic

overproduction and unprofitableness which the lumber manufacturing industry wishes to remedy have such a profound and pernicious influence upon those principles of forest land management for which the forestry profession stands, that foresters are deeply interested in their correction. Mr. Compton urges consideration of the following:

"First, that the Congress of the United States, be asked to take such action by joint resolution, or otherwise, as may be necessary to suspend temporarily for the period of the present national economic emergency and until further ordered by action of Congress, the restraints of the anti-trust laws, particularly the so-called Sherman Law, *insofar only as these laws relate to coöperation between competitors for the purpose of controlling production, stabilizing markets, maintaining employment opportunities and conserving natural resources.*

"Second, that the natural resources and other basic industries be permitted for these purposes to take such steps as in their judgment may be necessary to effective restoration and stabilization of industry and employment, subject to such supervision by the Federal Trade Commission or other competent federal agency as in the interest of public welfare may be necessary.

"Third, that the Congress of the United States be urged to give prompt consideration to such permanent supplementing of the present system and administration of anti-trust laws as may be in the interest of permanent progress of business and industry, security of employment and public welfare."

There is no doubt that modification of the anti-trust laws will engage the attention of the present Congress. This, however, is not simple. The public will look upon any tinkering with its anti-trust laws with apprehension and will not sympathize with any attempt at changes which it does not regard as compatible with its interest. The character of the long list of "cease and desist" orders of the Fed-

eral Trade Commission give proof of its need and value to the public. An out-and-out repeal is unthinkable. If, however, the laws are so imperfect that industry cannot do what it ought to do—put its house in order by its own efforts,—modification seems obligatory. The winter's discussion will throw light on what is needed. Perhaps after all the arguments are in, it will be found that the laws need no modification at all but simply clarification—a definite committal of what the industry *may* do and what it *may not* do. There is really uncertainty as to the application of the laws that vexes and disturbs the industry. Dr. Compton puts it well thus:

"As long as the twilight zone of the anti-trust laws continues and especially as long as it involves uncertain liabilities in terms of criminal penalties, so long will the anti-trust laws prohibit—or at least prevent—not only *unreasonable* restraints which are harmful, but also *reasonable* restraints which are helpful. In the experience of the lumber industry is not what *is* unlawful, but what *may* be unlawful which has been the deterrent to more effective self-regulation, and has cost the industry and the public untold millions of dollars in terms of wasted resources, irregularity of employment and depletion of sources of national wealth.

One cannot help wondering if the lumber industry of its own accord, even untrammelled by any restrictive laws, could accomplish much to adjust production to consumption and to stabilize prices. The burdens that underlie its present difficulties would continue. Timber reserves would still accumulate the costs of taxes, interest and other charges even if the holdings are merged. The pressure to liquidate would still be there. Many an operator would voluntarily quit cutting his timber were it not for the spectre of mounting carrying charges. What the industry really needs, but doesn't dare ask for in so many words, is some control of prices that would assure it of at least a fair and reasonable return on the stump.



ge itself and some financial scheme for holding its timber in reserve until it is needed. It should have both. Lumber certainly should be worth the cost of conversion and distribution, a profit *and* a price for the stumpage. Coupled with mergers of timber holdings and the elimination of excess mill capacity, this control would automatically alleviate the pressure to liquidate and would give a better opportunity to curb and adjust the desire to do so in keeping with market demands. If it is not feasible, perhaps the government itself will have to step in and supervise the depletion of timber reserves as it would a public utility. Many lumbermen would actually welcome it. Our most colossal national blunder was to force our natural resources into

private hands. But the mistake has been made and we must rectify it as best we can.

The lumber industry is not too well entrenched in the public's favor and is not likely to get what it needs without laying itself open to suspicion. The public, however, regards the forestry profession with favor as its friend and the guardian of its forest interests. The desirability of helping the lumber industry out of its fundamental predicaments is too obvious to a student of forest management but the public and its representatives need enlightenment upon it. In this foresters can be of help as opportunity is offered. Until the trouble is corrected, forestry on private lands is out of the question.

# MORE PRACTICAL AID AND INFORMATION: THE SINE QUA NON FOR PRIVATE FORESTRY DEVELOPMENT IN THE SOUTHERN PINE REGION<sup>1</sup>

By RALPH C. BRYANT

*Yale University*

Progress of forestry in the South will be slow until more practical information and aid is offered the owners of forest land. General suggestions and plans must be replaced with concrete programs based on studies of all the factors affecting the handling of a specific property. Aid in attaining improved and diversified utilization is more urgently needed than high powered, abstruse silviculture which the owner can neither understand nor apply. Coming from a man whose experience and knowledge of the possibilities and limitations of southern pine forestry are equaled by those of very few other foresters, these arguments are significant of why forestry has lagged in the past and of what the forester must be able to furnish to put it into effect.

TAKEN AS A WHOLE, there probably is no section of the United States which presents more favorable conditions for the production of timber crops than the region under discussion. The growing season is long; indigenous species are rapid-growing; natural reproduction may be secured readily by proper treatment of the forest during the process of logging followed by adequate forest fire control which is more simple than in some other regions; the territory is favorably located with reference to outside markets and has an increasing potential local market; the local pines are adapted for a diversity of uses; relatively large areas of cheap land are available which will not be required for agriculture for many years; land taxes are lower than in some other forested sections; the topography is favorable for cheap logging; the climate is such that harvesting and manufacturing operations may be carried on throughout the year; and the development of high-grade highway systems is making transportation of products from the forest to the conversion plant more simple each year.

Forest management in the region has received consideration by public and pri-

rate agencies for many years. The first real efforts, however, date from the early part of this century, when the Bureau of Forestry of the U. S. Department of Agriculture undertook the preparation of "working plans" for various properties which plans, however, did not prove satisfactory for several reasons, among them the fact that the economic conditions were not yet ripe for such plans and those for whom they were prepared often were more interested in the term "forestry" than in crop production with all that it implies. With the exception of a relatively few large private land owners the attitude towards forestry on extensive southern holdings has not changed greatly in recent years. Under state supervision marked progress has been made in fire protection but beyond this point most large forest land owners and operators have not progressed far in so changing their logging operations that young growth is protected and seed trees left for restocking the land, and careful thought given to other measures essential to true forestry practice.

We have heard much of farm forestry in the South in recent years and progress has been made in this field chiefly d-

<sup>1</sup>Presented at 31st annual meeting of the Society of American Foresters at New Orleans, La., Dec. 29-31, 1931.



the various public agencies which have been engaged in its promotion.

To secure real progress in forestry in the southern pine belt we must go far beyond farm forestry. Although in the aggregate the production of wood on such holdings represents an appreciable volume, yet in no country in the world has it been possible to supply existing needs solely from such a source. The successful management of a small forest area is surrounded by many difficulties because the annual volume of wood available is limited and often variable and must be handled chiefly by small mills whose output frequently is not well manufactured; the annual output available for sale is small; and the volume of given grades very limited. The chief outlet for the production of such mills operating on farm woodlots and other small forest areas is through the wholesaler who, unless the profits from handling small-mill timber are relatively high, usually prefers to deal with a larger manufacturer who has volume production of high grade products, whose financial background is excellent and who can deliver lumber of any desired quality and in any quantity in a short period of time. This simplifies the purchasing problems of the wholesaler because he deals with a few large concerns rather than with many small ones, thereby saving in bookkeeping, inspection and similar costs in addition to dealing with firms which, because they hope to continue in business for an indefinite period, are ready and willing to make prompt adjustments in case of differences of opinions concerning shipments which may arise between producer and distributor.

The hope of the future lies in the establishment of forestry practice on areas of adequate size to yield an annual wood output of sufficient volume to prove attractive to potential buyers; which will justify the installation of proper equip-

ment for the seasoning and remanufacture of lumber and the preparation of other products; and which will be capable of administration and protection at a reasonable cost. Such tracts need not comprise such extensive areas as have been and are now owned by large lumber companies, but rather those of from 25,000 to 50,000 acres, the annual output of which will justify a relatively small but efficient manufacturing plant.

The reasons why forestry has not been introduced on medium- to large-sized holdings are many and varied but I venture to say that if the same energy had been applied, in an intelligent manner, towards putting large-scale private forestry "on the map" in the southern pine region, as has been applied to "farm forestry" the result would have been more favorable.

The woodlot problem is a fairly simple one and has required only a modest amount of knowledge concerning the economic aspects of forest management because it is a side line attached to a major industry, agriculture. Any returns over and above those which the farmer could realize from the previous haphazard treatment of his woodlot have been regarded as profit. Further the farmer has long been accustomed to absorb public gratuitous advice and, therefore, the "sales resistance" on his part against forestry has been relatively low.

The extensive holdings of lumber companies in the South were acquired primarily, often many years ago, for the purpose of manufacturing lumber for profit. The ownership of land and the processes of harvesting timber have been engaged in chiefly because of the security offered with reference to a raw material supply and to guarantee the owner a constant flow of raw materials to his plant without being subjected to the idiosyncrasies of the usual type of logging contractor. He has been and is,



primarily, a manufacturer with all of the instincts peculiar to that form of industry. He has not been brought up in the school of crop production—a very different form of endeavor from that of manufacture—and only in occasional instances has he been interested in it. His chief concern in raw materials has been the unit cost delivered at the plant and the available supply during the period which he considers necessary to operate in order to amortize his fixed investment.

Unlike the farmer, the lumberman has been a close student of balance sheets and with heavy current carrying charges to meet he has been forced to seek present income rather than future. Many lumber companies are controlled by non-resident stockholders whose chief interest has been satisfactory dividends during the life of the original operation. The resident manager, therefore, has before him constantly an urge to produce immediate revenue from invested capital and he is slow to embark on a new venture with which he is unfamiliar and which also may mean an added expense, returns from which may not be available to present stockholders during their life time.

Selling the idea of forestry to such an owner or manager or to his stockholders is a more difficult task than to a woodlot owner and requires a far more extensive economic background and knowledge of the problems of crop production and utilization.

The solution of the problem of whether forestry is practical for a given operator can only be determined after a careful study of the raw materials owned or available, the life of the operation, the condition of the cut-over lands and their value in a forestry program, the type of products produced by the operator, relative profits from raw material conversion, attitude of the owners and the managerial and logging staff towards forestry and

like factors, all of which may and often do vary on every large tract. A plan which may be admirably adapted to one operation may be wholly unsuited to another. Each operation, therefore, must be considered on its own merits and generalized data more or less applicable to woodlots is of little value.

The active or passive resistance towards forestry exhibited by large forest land owners cannot be overcome by general plans, based on a brief and hurried survey of the property, but only by the display of at least a reasonable degree of understanding of the problems of a specific owner and by presenting a concrete program pointing towards financial returns based on sound economics which does not demand too much detail during the initial stages. Success in this field requires that the forestry advisor have personal experience in the lumber industry and a sympathetic and understanding attitude towards the land owner and his problems.

Any successful plan of management for a large forest property in the South must center for the time being around utilization and the distribution of products rather than intensive silviculture because the first two mentioned subjects represent the chief problems confronting the southern pine lumbermen today. No matter how successful a forester may be in growing timber his efforts have been fruitless unless there is an opportunity to successfully market the crop, and rarely can a forestry program be "sold" to a forest owner who finds himself seriously handicapped in marketing the ripe timber he owns. What is needed today to sell forestry to the large land owner in the South is not high-powered, abstruse silviculture which the land owner does not understand and cannot apply and, therefore, is not interested in, but aid in diversifying and improving the utilization of the timber he now possesses.



Exhaustive silvicultural research has a place in any forestry program but requires years of painstaking work. Just as Nero fiddled while Rome burned, so also we may be "fiddling" with silviculture while the forests disappear. When the problems are solved and the principles ready for application, the forests may be gone. Why not face the problem squarely and provide the land owner with a form of management, imperfect as it may be, which he can apply before his forests are gone rather than wait until we can offer a perfect solution with no forests in which to apply it?

There has been marked progress in the field of utilization but much remains to be done before the region is ready for intensive silviculture and management. Some excellent utilization studies have been made by the Forest Products Laboratory and by individuals which demonstrate the fact that trees and logs of certain minimum sizes and qualities are sub-marginal in value for saw-log purposes. Such work has great potential value from the forestry viewpoint, because an owner, if convinced that certain trees are sub-marginal, will leave them standing in the forest and they then will form an excellent basis for a "second-cut." However, the "sphere of influence" of such studies has been relatively narrow. The results from a study of one operation cannot be translated bodily to another, having different conditions and costs and because operators know this, it takes intensive and painstaking personal effort to convince them. The widespread dissemination among southern pine operators, both large and small, of technical information on the utilization losses incident to harvesting sub-marginal trees and logs and the enlistment of their hearty coöperation in applying it are the urgent needs of the hour because, combined with adequate fire protection, it represents the chief hope for a "second-

cut" in southern pine during the next two decades.

The time has arrived in the southern pine region when a lumber producer needs a profitable outlet for material other than saw-log stock because the latter does not utilize enough of the wood content of the tree. A market other than saw-log, for tops, thinnings, and coarse limby trees will serve to remove debris from the forest, add to the revenue obtainable from a given tree, and promote forestry by improving the quality of the remaining stand and by reducing the fire hazard. The creation of a market for low grade hardwoods, unsuitable for saw logs, especially in mixed pine and hardwood stands, will aid in the disposal of cull hardwoods which now occupy a relatively large area of ground space on which a new and profitable crop cannot be started until they are removed. Improvement in the technique of logging, manufacture, seasoning and remanufacture will add to the profits of the business—in some cases taking an unprofitable operation out of the "red"—thus making the opportunity to practice profitable forestry more of a realization than a dream.

Aid along these and similar lines, including protection, will do far more to create a live interest in and to further the practice of large-scale forestry in the southern pine territory than efforts to introduce intensive silviculture for which the region is not yet ready.

There may be a limit beyond which public agencies should not go in furthering the welfare of a purely manufacturing industry. The lumber industry, however, is in a somewhat different category than some others because it is vitally concerned with two problems of tremendous importance in our economic life, namely, the harvesting and manufacture of a product, wood, which is an absolute necessity and the utilization of a vast area of land which is not now and much

of which never will be required for agricultural crop production. The future of our Nation is dependent, to no small degree, on the perpetuation of an adequate local wood supply and on proper land use. Extensive aid extended to the industry in the wise and successful solution of these problems is amply justified on the basis of public self-interest. From the standpoint of public welfare, therefore, we should not hesitate to offer every legitimate and essential aid to the effi-

cient use of existing timber resources and to their perpetuation by the production of forest crops on private holdings.

To this end the owners of extensive southern pine holdings should be provided with more aid and guidance in forest research work of immediate practical application than has so far been available to them. Progress in the development of forestry on southern holdings will move slowly until this has been accomplished.

## COMMENTS<sup>1</sup>

By A. J. STREINZ

*Louisiana State University, Baton Rouge, La.*

Professor Bryant contends that the larger owner of timberlands in the South has not received his share of federal aid in proportion to his importance in the development of private forestry practice. Whether or not a given present day exploitation enterprise can be converted into a forest enterprise is a question to be answered only after a thorough study has been made of the administrative problems of the large property and the identification of the economic factors which govern the conversion of such an enterprise to even one of crude forestry practice. Professor Bryant believes the determination of this basic data for large owners is of such importance as to justify federal aid. I do not believe he has in mind the making of working plans for such operations by the public forester as was done in the days of the old U. S. Bureau of Forestry. This task is certainly the field for the consulting forester. The thought is to extend federal aid through a public forester assigned the task of making case studies of large property problems, particularly those problems which the consulting for-

ester and resident forester cannot readily deal with.

The old idea "A forester is through with a tree when he has grown it, ready to cut. He then has no further interest in the matter" has been modified by many of us to include interest in the tree's utilization even by the ultimate consumer. Professor Bryant intimates we have scarcely begun to cope with the utilization problems of the large owner. He contends that future progress in private forestry now awaits the meeting of these utilization problems. This is not only true of the large owner but is true of farm forestry as well. I am dubious as to the value of farm demonstration in thinnings and improvement cutting because it is seldom that we can definitely give aid in the marketing of the wood produced, with or without such methods. Many manufacturers of wood products lack the complacent faith in the forester in the future marketability of their products. With our lack of essential information to back up our claims, the manufacturer's point of view

<sup>1</sup>Presented at 31st annual meeting of the Society of American Foresters at New Orleans, La., 1931.



s seldom changed. He can not see the need for future supplies or the private forest enterprise.

While the pressure from timberland owners is to find or create a market for their low grade material and weed trees, we do not believe all our efforts should be concentrated on this problem. Today the manufacturers are having difficulty in holding the market for the products made from their best raw materials. If these markets are to be held improvement in quality, merchandising, woods operating methods, and the manufacturing process must take place. The trade associations are aware of this. It behooves us to work with and give aid to these associations. Unlike Professor Bryant, I believe the practice of forestry in the South will be by owners of small-sized timber tracts and not by owners of from 20,000 to 50,000 acres of timber supplying their own manufacturing plants. Of course there will be a few such forest enterprises converted from the present-day exploitation operation with unusually favorable conditions for conversion into a forest enter-

prise. The future is with the small owner who will not own a conversion plant, but sells his wood to small portable conversion plants. The output of these small plants will go to a concentration plant, the owner of which will market it with or without further manufacture. The growth of the concentration plant with its feeder mills and small tracts of timber is dependent upon the development of public roads suitable for motor truck transportation. That these roads will be built is a sound assumption for the South. The concentration plant owner can meet the requirements of the wholesaler as to volume available, quality of products, delivery, financial position, and adjustments in case of disputes which ordinarily the small owner can not do. It seems necessary therefore that the public foresters continue to direct most of their efforts to farm forestry, and extend it to include the utilization problems of the small mill owner, small timber land owner, and owners of concentration plants.

### COMMENTS<sup>1</sup>

By A. E. WACKERMAN

*Forester, Crossett Lumber Company, Crossett, Ark.*

Professor Bryant's paper brings to our attention the importance of the South as a timber growing region and its possibilities. He shows a keen appreciation of the present situation when he urges more intensive forestry promotion among the large timberland owners. These brief comments are offered to supplement Professor Bryant's remarks along this line and to show that forestry is really needed by the lumber industry and that forestry should be promoted, not for its own sake,

but for the sake of the lumber industry and that now is the time to do it.

We have always thought of forestry as something that will cost the lumber industry money, but forest management, properly applied, will *reduce* the costs of lumber manufacture and so save money. A lumber company owning timberland, paying taxes and keeping the necessary land records and looking after the timber and land in the field is already paying more than half of the cost of forestry. For

<sup>1</sup>Presented at 31st annual meeting of the Society of American Foresters at New Orleans, La., Dec. 29-31, 1931.

only a few cents an acre more, technical supervision and good fire protection can be obtained. Technical supervision need not be costly as there are many phases of land and timber work usually looked after in a non-technical way that can be handled by the trained forester at no increase in cost, leaving only a small differential to charge against forestry. Fire protection with the state aid that is now generally available in the South can usually be secured for not more than 2 cents per acre per year and the increased growth obtained more than offsets the cost.

Changes in the cutting program of a company adopting forest management such as the leaving of seed trees and under-sized trees, can be made at no increase in cost to the operation; in fact, the leaving of small trees effects a saving in logging and milling costs, as several studies have shown. And if logging changes are required, such as the substitution of truck haul for railroad transportation due to the smaller volume of timber on second-growth lands, then the ingenuity of the southern logger will not fail; it never has in the past with greater obstacles to overcome.

The cost of applying forestry need not be much but the savings can be considerable, and the greatest item of saving is that arising from an extended life of the operation.

A company operating for a temporary

period of from 25 to 30 years is paying a good price for not practicing forestry. Depreciation is a cost item of consequence and depreciation costs on a temporary operation are much higher than would be the case if the operation were permanent or even had its life doubled by the practice of forestry. The liquidation of a going business at the end of its run, materials is an expensive affair involving the scrapping of town, plant, logging equipment, and good will. How much forestry would save for a temporary industry by making it permanent could be answered by any lumber company manager, and it would be a good round sum.

Greater progress will be made in establishing forestry in the South when lumbermen are shown that forestry is *not* a costly practice but rather a means of reducing costs and that no great changes are needed in their methods of doing business. After all, there is but little difference between holding a large block of stagnant virgin timber while operating and holding a large block of young growing timber while operating the oldest stands. All that the lumber business needs is a different *conception* of timber management. Once that is fixed, good forest management will come easily.

The lumber industry in the South today is looking for relief from high costs. Now is the time for the forestry profession to come to its aid, not with more costs but with a way to lower costs.



# THE SMALL MILL—ITS AWAKENING AND DEVELOPMENT<sup>1</sup>

By A. S. BOISFONTAINE

*Assistant Secretary, Southern Pine Association, New Orleans, La.*

More than one-half of the lumber production of the South comes from small more or less portable mills. A mill may be moved and set up for as little as 200,000 board feet. Most of the timber is second growth and comes from the cut-over lands of past large operators though more commonly from farmers' woodlots. Most of it is hardly ripe for the saw. The small mill has distinct advantages which assure its continuance as an important factor in the lumber industry; it also has decided disadvantages which in the aggregate tend to demoralize lumber markets. The author's discussion of these factors from a lumberman's standpoint indicates what problems the forester has to contend with to advance the practice of forestry on small holdings.

**W**HY IS IT that so much attention is being given these days to the smaller sawmills of the South?

It is not because they are absolute newcomers in the field of lumber production, for small mills have always operated in this section. Is it due to any clamor that they themselves have raised for recognition? This is not so. Why then, has every recent meeting of lumbermen included this as an important subject of discussion? Why have our research laboratories designed special projects for the benefit of the small mills, and why have you, the men responsible for the perpetuation of our timber supply, become interested in their welfare?

It is because almost overnight everyone seemingly awoke to the fact that more than half of all the southern pine lumber produced comes from mills cutting below six million board feet a year. These thousands of small mills can no longer be ignored as production factors. The latest survey, made by the Southern Pine Association in the fall of 1929, showed that of the total pine produced, 53 per cent was cut by small mills. Just think of it, over six billion board feet a year. In Georgia, small mills accounted for 91 per cent of the pine produced in that state; in Virginia 80 per cent; North

Carolina 74 per cent; Alabama 68 per cent; South Carolina 66 per cent. While small mills produced only 39 per cent of Mississippi's total cut, the volume represented was exceeded by only two other states, Alabama and Georgia.

In the light of this, it is evident that the efforts of the organized larger mills to standardize grades and sizes, to compile representative statistics, to cope with wood substitutes, and to extend the markets for southern pine lumber will be futile without the full coöperation of these smaller units. That is why our big mills, and our trade associations, have become interested. It also seems clear that the perpetuation of our timber supply will be dependent entirely upon their efficiency in logging and production methods. Foresters, therefore, should be vitally concerned with this development.

Now, of just what type of operation are we speaking when we talk about the small mill? How is this tremendous volume of lumber produced and placed on the market? Where do they get their log supply, and what is the volume and type of their individual production? These are all points that should be of interest to you and that are fundamental in any consideration you may give to this subject.

<sup>1</sup>Presented at 31st annual meeting of the Society of American Foresters at New Orleans, La., Dec. 29-31, 1931.

The actual production unit usually is in the form of a portable mill, driven either by a Fordson tractor or a steam engine. During recent years, the tractor outfit has been used to a greater and greater extent. The average portable mill will cut from 3,500 to 6,000 board feet a day, and runs on an average of 75 days a year. In some sections, they have an annual output of less than 200,000 feet. Small mills in northern Alabama and northern Mississippi probably average 400,000 feet a year; in the "roofer" section of Georgia, 500,000 feet; in the Carolinas, from 350,000 to 500,000 feet.

The small mill crews ordinarily consist of the owner and three men on portable outfits, and the owner and four men on steam driven rigs. As these mills operate almost exclusively in second-growth timber, largely grown on farm wood-land, the size of most of the trees has confined their output to the simplest of products. By and large, dimension and boards, with a little rough finish, represent their range of items, the vast majority of the mills cutting their material to a scant 2 x 4. The only grading that is done of this dimension is to separate it into No. 2 and Better and No. 3. Usually the No. 2 and Better requires 60 per cent with 4 square edges, and 40 per cent with 3 square edges the entire length. Of course, it contains a good percentage of No. 1 clear stock, although no attempt is made to segregate it.

The manufacturing process naturally does not stop with the small portable mill in the woods, but goes on through the planing mill or concentration plant, which is a separate and distinct operation. These concentration plants are located at strategic points on railroads and depend entirely upon the portable mills for their supply. As a matter of fact, in most instances the planing mill controls the production unit, either through ownership of the timber upon which it

is operating or through the extension of financial aid to take care of plant investments and labor costs. The hauling is usually done by auto trucks. On the whole, the concentration yards make no effort to further refine the grading of the material that is delivered to them, and the sale by them through wholesalers of this vast quantity of dimension is largely based upon the combination grade of No. 2 Common and Better.

At this point, I might mention that the key to the whole small mill question is in the hands of the concentration plant owner. It is absolutely impossible to reach the portable mill operator at all. In many instances he is a farmer. In others, he is little better than a day laborer. He conducts no correspondence, has no office and keeps no records. On the other hand, the average concentration plant operator is an alert and aggressive individual. He must be so to succeed in this kind of business. Such organization as may be accomplished of the small mill operators must be confined to these concentrators of production. They, also, are the only ones who can be reached along lines of economics, marketing improvement and production efficiencies, and I am sure the same would be true of forestry.

To fully comprehend how the timber supply for these thousands of small mills remains almost constant, we must keep in mind that they will establish a new location in order to cut only 200,000 board feet. In other words, a move is warranted if a tract promises to yield six months' supply of logs. Under pressure the small mill can be moved in three days. Usually a week is consumed in moving from one location to another.

Good roads and the auto truck have been the most important factors in the development of this type of operation. It was only relatively a few years ago when it was unusual to go more than



ree or four miles back from the railroad to reach timber. Now it is a common practice to go as far back as twenty miles by auto truck, and logs sometimes are shipped by rail as far as one hundred miles.

Some of this timber supply is found on tracts which have previously been logged by larger operators, in the form of sections that were inaccessible or which contained too few mature trees at the time the woods crews were going through to warrant cutting. Another important source is those vast cut-over areas which the ideal growing conditions in the South are rapidly replenishing. A third and very important source of supply is from the farm wood-lot. In the "roofer" section of Georgia, the pine lumber is nearly all produced from timber obtained from the farmers. Frequently the operators buy the timber. Sometimes the farmer saws it, and sometimes the timber is sawn by outside mill men, who work under contract. The farmer usually insists, as part of the contract when selling his timber, that he be furnished work for his team in hauling the lumber to the planer. This farm-lot timber in the Carolinas and Georgia is old-field pine, with characteristics that make it unsuitable for stress timber or small framing, and so most of it is put into boards that have come to be known generally as "roofers."

During recent years, the small mill production in Alabama reached unbelievable proportions. It developed that this state carried much hidden timber, particularly in the old plantation counties in the central and southeastern part of the state—also in the mountainous counties in the northern part. Very little of the small mill production in Alabama is by independent operators, 80 per cent being financed in varying degrees, by wholesalers and planing mill owners, from a \$50.00 loan up to the full investment in timber, plant and pay-roll. This control

of small mill production is equally as strong in North and South Carolina, Georgia, Mississippi and Florida. In Louisiana, Texas, Arkansas and Oklahoma, the small mill operator still appears to be more or less on his own.

The tremendous volume of small mill production during recent years has not been brought about merely through the "cutting out" of the larger mills, the development of the tractor outfit and the increased mileage of good roads in the South. An important influence is the depressed agricultural condition which has existed for some time. In parts of South Carolina and Georgia, as well as in most of the other states, the farmers have been forced to sell their tracts of timber in order to get money. Hundreds of small mills have been put in operation by the farmers themselves, in localities never before regarded as a source of lumber supply.

It is also true that the speculative, or so-called "jerry" builder, who was so active during the post-war period, contributed in no small measure to the increased production by small mills. In most markets, there was a persistent demand for cheaply manufactured lumber. The greatest demand was from the builders of frame dwellings, to be sold on the installment plan. These contractors, through the use of paint and attractive architectural designs were able to cover up, temporarily at least, the inferior lumber used in the structure. Many of lumber's biggest markets eagerly absorbed a quality of lumber cut from trees which a few years prior would not have been considered as merchantable. A tremendous increase was accordingly seen in the demand for "roofer" stock, and for No. 2 Common and Better Dimension.

Since the fall of 1929, small mill production has declined to an even greater extent than that of the large mills. They were in a position to immediately curtail

or shut down, when business became unprofitable. In October of this year, the Southern Pine Association gathered figures covering 237 small mills, in the states of Alabama, Florida, Georgia, Mississippi, Arkansas, Louisiana and Texas. Of these 237 mills, 188 were closed down. The 1931 production for the group will be 47 per cent below that of 1930, and 66 per cent under 1929. This summary, in our estimation, gives a good cross-section of present operating conditions among the smaller mills generally.

There is no question but that the small mill is here to stay. It is in an ideal position to either curtail or expand its production, in accordance with the fluctuations of lumber demand. The operators own little or no standing timber, and so, while inactive, have no taxes to pay. They have no responsibilities to labor, because the mill workers are usually the operators themselves and their families. On the other hand, with an awakening of a sufficient demand to assure a profitable return, the small portable mills can spring into activity over night. This has been the experience in the past, and with the countless tracts that are still available, in almost every southern state, hundreds of small mills now down might easily resume operation as soon as conditions become better.

It is also doubtless true that with the cutting out of the bigger mills, the portable outfit will represent the most economical and efficient means of sawing the trees that remain on scattered tracts, and harvesting our timber crops of the future.

Now, what is the southern pine lumber manufacturing industry doing about this? In speaking of the industry, I refer of course to the bigger operators who in the past have always guided its destinies. They realize that something must be done not only to help the smaller operators meet today's problems, but to fit them for industry leadership in the future.

Their interest is not altogether unselfish because all of their efforts in standardization and marketing improvement will be without avail if the smaller operator is permitted to go along unguided as he has in the past. Market research has revealed the fact that unless some efforts are made to standardize the products of all southern pine mills—large and small—and to raise the general level of quality, many of the markets which have always been ours, and which belong to us naturally, will be lost.

You will readily understand this when you realize that the retail lumbermen in most of the large cities have been forced to stock this small mill product. Competitive conditions have brought this about, low prices being the only consideration. While the Southern Pine Association might convince large industrial buyers, architects and wood consumers of the superior merits of southern pine as a construction material, the first experience of such a convert, in attempting to fill his requirements from local retail stocks, would be disastrous. He would find a kind of southern pine entirely different from that upon which he had been sold. This, more than anything, has given rise to the often expressed belief that good lumber is no longer obtainable. One such experience will naturally turn the specifier or user to another species of lumber, or to a wood substitute.

As the Southern Pine Association in the machinery of these manufacturers for accomplishing the many things that must be done coöperatively, it was but natural that this agency should be used to organize the smaller mills. As a first step, their interest was aroused in the benefits of Association supervision of grading and manufacture at the mill. While their lack of contact with trade promotion effort and organization work in general made them unappreciative of the necessity for the entire program of



association activities, they nevertheless could see the advantage to be gained from inspections and instruction in grading. Special services were therefore designed for the smaller operators, with a charge sufficiently low to make it possible for them to subscribe. In a little over a year, nearly one hundred concentration plants and small sawmills, representing an annual production of close to a half million board feet during normal times, have become associate subscribers to the Southern Pine Association.

This organization of the smaller operators means that there will gradually be extended into a major part of this production the degree of uniformity and standardization that has always prevailed among the mills subscribing to the Association. Through meetings and personal contacts, the operators will learn to keep in touch with prevailing economic conditions, and conduct their business in the light of these facts. The frequent meetings of these groups should also go far in making possible the consideration of any problems in which they have a common interest. Manufacturing practices, relationships with marketing agencies, efficiency of sales representation, and the better distribution of their product are all subjects to which their attention might profitably be given. They will learn of the necessity for the industry to present an organized and united front in fighting its battles, and will gradually assume the responsibility of working out industry policies that will surely be theirs in the future.

Already tremendous strides are being made by the small mills in perfecting their grading and manufacturing methods. The slipshod practices that are common during experimental periods are fast being abandoned. The program of the Southern Pine Association is proving of help, even beyond the number that have contracted for its services, for its meet-

ings are open to all operators, regardless of Association affiliation. At all of these meetings and through publicity, stress is placed upon the present and future demand for good lumber, and we feel the groundwork is being laid for quality production by the small operators of the future.

I was recently told by a representative of the Atkins saw people that he had never before experienced such a demand as exists today among the small mills for re-saws and edgers. This is a very encouraging sign. All of you are doubtless familiar with the efforts that are being made to develop several types of small portable band mills. One of these is being used very successfully in Alabama, and its output will compare in perfection of manufacture with any large mill in the country. Another, developed by a manufacturer on the Atlantic Coast for his own use, has now been placed on the market.

You are also acquainted with the results of the study conducted by Mr. Ralph Lindgren, of the efficiency of dipping solutions in the elimination of sap stain. The discovery that lignasan, the Dupont solution, may be used cold was of outstanding importance to the smaller mills, for most of them were without steam and it would have been impossible for them to use this efficient antidote against bluing if a hot dip were required. A surprisingly large number of these operators are now dipping their lumber. They realize that even in boards and dimension, appearance plays an important part in the sale. This is just another indication of the decided trend toward quality production.

The small mill project of the Forest Products Laboratory, in charge of Mr. C. V. Sweet and Mr. C. J. Telford, should also be instrumental in improving the quality of the lumber produced by the small sawmills. The Laboratory is not

only conducting original studies, but is using every available means to put into practical application the results of investigations and experiments made in the past.

In conclusion, may I remind you that this transformation in the southern pine industry has a distinct bearing upon your work? Not being a forester, I have no idea as to how you can best meet this changed condition. I do know, however, that the logging of small tracts and farm wood-lots has brought into production too many undersized trees. It is generally true that the farmers of the South do not grasp the financial possibilities in their woodland. A program of education for

the farmer is needed, through which it would be made to understand the necessity of maintaining continually a growing stand of pine, and the advantages of periodic selective logging. There is no question but that slower and more intelligent marketing would more than double the realization received by the farmer for his stumpage, and for that matter, this is true of all of the small operators.

I know that you are already undertaking to find the answer to this problem through the Southern Forest Experiment Station. Judging the future by the past I am confident you will succeed.

## COMMENTS<sup>1</sup>

By ROBERT MOORE

*Extension Forester, Baton Rouge, La.*

It is a little difficult to discuss Mr. Boisfontaine's paper for several reasons. Work of the type being done by the Southern Pine Association is a very new thing. Few of us are as familiar with it as we should be. There is probably doubt in some minds as to the benefits to be derived from such work. Many of us doubtless feel small mills are not desirable, but a large permanent wood utilizing plant is the only possible and indeed the ultimate type of conversion unit. All these facts are probably true, but to quote a famous speech, "We are confronted with a condition and not a theory." We have the small portable mill with all its attendant evils of depleted woods capital, poorly manufactured, poorly graded if graded at all, and poorly marketed products which are threatening our future timber supply and are destroying our present lumber mar-

kets about as rapidly as the substitutes are doing it.

The Southern Pine Association is attempting to correct the kindred evils of poor manufacture, grading and marketing, leaving to the foresters the correction of poor woods practices. It should be noted that we are getting the harder task. The Southern Pine Association says the individual operator is absolutely impossible to reach. Yet we are faced with the responsibility of meeting him and convincing him that he should alter and improve his logging and woods practices. What does this mean? It means that small and large we do not have even the aid of an example set by the large operator to help us. The woods practices of the large operators have not kept pace with the improvements made by them in manufacturing. This has been said before and is still too true. How best we as foresters

<sup>1</sup>Presented at 31st annual meeting of the Society of American Foresters at New Orleans, La., Dec. 29-31, 1931.



bring about an improvement in the methods practices of the larger operators the subject of a paper to be presented this morning. I do not believe we can measure the degree of improvement we desire among the small operators unless there is a corresponding improvement on the part of the larger operators.

The small mills have an advantage, as Boisfontaine pointed out, in the cheapness at which they can operate. J. Telford estimates that they can operate about 20 per cent more cheaply than the larger mill. Another advantage that might be mentioned lies in the terms under which the small operators in the "roofer" section of Georgia sell their product. Their sales are all on terms of sight draft attached to the bill of lading." Two small mills of equal capacity under the same ownership the capital requirements are about \$10,000 less at the mill where the terms of the Roofer Club are used. The entire lumber industry might well adopt these terms. It would release a large amount of capital now lying largely dormant in the form of accounts receivable.

The immediate problems of the forester as a result of this new emphasis by the Southern Pine Association on the small mill will hardly be affected at all. The cutting of undersized trees and the failure of farmers to realize the value of their timber is not new. Two moves could be made to eliminate these ills. A strong recommendation that the Association subscribers purchase timber on log scale only would at once stop the cutting of many small trees. The revision of grading rules to heavily penalize narrow widths within the grade will also quickly improve the situation. Further studies, such as those of W. Ashe and the Forest Products Laboratory, to determine the size of the profitable tree are badly needed and are the best ways of showing the small sawmill

operator at what diameter his profit becomes a loss.

To bring the farmer to a realization of the value of his woodland and timber, other measures are necessary. He must have a source of price information. Forests are a crop and we recognize them as such. The Bureau of Agricultural Economics of the Department of Agriculture releases reports on the prices of cattle, hogs, corn, cotton and many other farm products daily and weekly. Similar reports should be issued periodically for logs, pulpwood, posts, poles, ties, piling and other forest products. They should be sent out through the national press associations along with the crop prices, they should be broadcast over nationwide radio hookups and should be published in the trade journals of the lumber and allied industries and in the farm papers of national and local circulation. Already there has been a demand from farmers for just this type of information. County agricultural agents who are dealing with the farmer every day have asked for it. It will meet with a ready acceptance and will help bring forestry closer to the man in the street and on the farm if he sees a periodic report on the prices of forest products.

We should go a bit further and develop a regular outlook service similar to and even exceeding the scope of the work now being done by the Timber Conservation Board. This work will give the forest products industries a basis on which to plan their operations similar to the basis available to the steel industry and particularly to the public utilities whose splendid work in the forecasting of business conditions as an aid to their building and expansion programs are doubtless familiar to you.

It is all too seldom that the forest products industries come to us with a demand that we can fill. The agencies for such a program as I have outlined

are available. The demand has come from the farmer, the county agent and the Southern Pine Association, and we should certainly fill it.

The entire program of the Southern Pine Association in connection with the small sawmill is an encouraging sign. It means that a major lumber trade association is now seriously working on a project heretofore almost exclusively the realm of foresters. This may indicate that more foresters will soon be employed by lumber companies. We certainly need them. We need them employed not as

assistants to logging superintendents so many of them are at present, nor as fire chiefs wearing a red hat and shouting and crying "fire" through a nickel-plated trumpet but we need real foresters, well trained and able technically and practically to develop real plans for handling timber tracts. When this has been achieved we will find forestry being given consideration equal to that accorded grading by the lumber association. If we can achieve this end through work with small sawmills, we should exert every effort in that direction, for when we accomplish this ideal, forestry will have arrived.



### GOOD MANNERS IN THE FOREST

You may be reasonably "wild and woolly" when you go camping in the national forests of the California region, but don't leave your good manners at home. Take them with you. You need them more on your vacation than when you are at home. The rules for good manners as given by the United States Forest Service are easy to learn and are followed by all good sportsmen, good campers, and good tourists. They are:

Obtain a camp-fire permit.

Carry a shovel and an ax.

Smoke only in camp.

Drown your fire dead out with water.

Leave a clean and sanitary camp.

Observe the State fish and game laws.

Coöperate with the forest rangers and State fire wardens in reporting and suppressing forest fires.

Practice these rules and preach them, too.

*Forest Rangers' Catechism.*



# THE GOVERNMENTAL ORGANIZATION AND THE FINANCING OF FOREST COMMUNITIES IN THE SOUTH<sup>1</sup>

By P. A. HERBERT

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The author views the cut-over land taxation problem from the community point of view, and considers it less a problem for foresters than a job for taxation specialists. Foresters have stimulated special tax legislation intended to encourage forestry practice but have ignored the reason for high tax requirements and the possibility of reducing them. According to the author, all of the fifty-odd forest tax laws on state statutes apply to very small fractions of the forest land area and most of them are inoperative or failures.

THERE are thousands of rural communities in the South, especially those containing a large amount of cut-over land, where the burden of taxation on real estate and on personal property has become nigh unbearable. The tax rolls of some of these communities show a large amount of tax delinquency. In the forest counties in Florida, 21 per cent of the assessable area was returned delinquent in 1929.<sup>2</sup> If such delinquent taxes remain unpaid for over an extended period, it indicates clearly that the owner does not consider the property worth enough to warrant paying the annual taxes and that, probably, he can find no one who is willing to purchase the property from him for more than the sum of these taxes and the penalties thereon. These excessive tax burdens, that tend to reduce the value of property to zero, are largely attributable to the constantly increasing demands for more public service—for better educational facilities, schools that will compare favorably with those in urban communities—for better highways, felt to be a necessity in this automotive age in which we are living—and for better protection, sanitation, and so on.

While it is true that many of the expenses incurred have been in the nature of "permanent" improvements that will be paid for before they must be replaced, still it is probable that such replacements as are necessary together with higher maintenance costs brought about by a demand for a higher quality of service and the demands for still more permanent improvements will generally prevent expenditures under *present organization* from ever being reduced materially. Indeed, it is likely that we will, in the future, demand still new governmental services of a kind not yet dreamed of except, perhaps, by the socialist.

For these reasons, it is very dubious whether governmental costs resting on real estate can ever be materially decreased except as such decreases are brought about by more efficient governmental organization and financing, or as such decreases are brought about by increases in the purchasing power of the dollar. Many of our recent declines in governmental costs have resulted from the latter condition, i.e., increases in the purchasing power of the dollar and not, as our politicians would have us believe, by real savings to the tax payer. In fact,

AUTHOR'S NOTE: I wish to emphasize that the statements here presented are not the official pronouncements of the Forest Taxation Inquiry with which I was associated from June 1926 to August 1931.

<sup>1</sup>Presented at 31st Annual Meeting of the Society of American Foresters at New Orleans, La., December 29-31, 1931.

<sup>2</sup>J. J. Goulden, Florida's Forest Land Problem. Bulletin No. 6, Florida Forest Service.

any community whose budget is as high this year as it was last year is in reality placing a higher burden on its citizens.

However, there really are many ways in which the heavy tax burden can be reduced on real estate and hence on forest property. Even though it is well recognized that the mode of rural life has changed completely in the last century, still, very few changes have been made in the structure and machinery of local government. These governments were organized in the horse-and-buggy days when five or six miles, and the return journey, away from home was all that a man could negotiate in a day and conduct his business. Now, with automobiles and good roads, the small counties or parishes as they are called in Louisiana are not only unnecessary, but they distinctly hinder efficient government. Years ago, too, governmental functions were relatively few and relatively simple—anyone could throw a few shovels full of earth in a wagon wheel rut, but now it requires a high degree of technical skill and training to construct and maintain our improved highways. Small poor communities simply cannot afford to hire, nor can they secure through election, properly qualified public officials to direct such work.

Then, also, good roads and automobiles broadened the area with which one individual can claim reasonable acquaintanceship and which he can represent intelligently in public affairs. Finally, ease of transportation has generally resulted in the development of the larger towns at the expense of the smaller settlements in the vicinity. Gradually, but surely, the smaller communities have disintegrated and their community centers have been absorbed by larger, but more distant villages. Some county seats, for instance, are now only a shell of their former importance, in fact,

continue to exist only because county business forces a few individuals to live there and forces others to come there on public business.

Hence, our smallest unit of rural government should be regional communities—areas bound by social, economic, and physical ties, but still large enough to secure the most effective public administration. In most states such units will coincide more closely with the present division into counties or parishes. However, many changes in present-day community boundaries must, and will in time, be made. The boundaries now often portray economic and social conditions of a hundred years ago. Changes in population, in land utilization, in transportation, and so on, may have utterly eliminated the ties which bound an area to the community of which it is now a part. Indeed, many of our county boundaries were never established on a logical basis, they were the result of political bargains and personalities which even at the time they were located were not to the best interests of the community.

It will probably be found in all states that if these local administration units are based on the factors just mentioned, i.e., social, economic, and physical characteristics and areas large enough to be efficiently managed, there will be fewer communities than there are today. For instance, the report of the Tennessee State Tax Committee suggests that the number of counties in the state be reduced from 95 to 50, recommending that 10 counties be immediately merged with others, that there be 9 mergers between 1933-35 and 15 mergers between 1935-40. The report states, that "... at least a third of the counties are of such small area and small value that even the type of government they have is a fearful burden for the citizens to maintain."<sup>3</sup> One consolidation

<sup>3</sup>Tennessee Taxation and Public Finance, Report of State Tax Committee, Nashville, Tennessee, November 20, 1930.



s already actually taken place in that state. In Georgia, where three counties were recently merged, there are still 159. Dr. Paul Wager of the University of North Carolina, an expert on county government, has urged that the 100 counties in his state be reduced to about half that number.

However, changes in county boundaries could not be entered into lightly. They could, except in the most obvious cases, be preceded by careful studies of the physical, economic and social characteristics of the communities. Data on these factors must first be gathered, then analyzed and future trends predicted before a community plan of land and human utilization can be prepared. Such a rationalization of the community will not only make it possible to secure the most efficient public organization but also aid private enterprise in increasing its efficiency. Rural zoning will result from such studies of the community's resources. At present, such plans insofar as private endeavor is concerned, will probably be persuasive but it is very likely that in time the social welfare will demand that they be made mandatory. It is likely, too, that some initial adjustments in public organization will be made voluntarily by the county, but that eventually the state will step in to hasten such adjustment.

All local public business in rural communities should be conducted by these adjusted county units. There should be no separate school, drainage or road districts. The board controlling the county policies would be elected as heretofore, but eventually the actual administrative duties should be centered in a county manager appointed by this board. The power to levy taxes should, of course, remain in the board. Thus, the will of the people would be expressed by the tax rates and policies laid down by the election board — true democracy and real

local control, but the responsibility for the execution of the policies so promulgated rests with one trained official—true 20th century business efficiency. The county manager should bring about savings in county administration and withall increase the quality of governmental services. A budgetary system of expenditures should be adopted and adequate sinking fund provisions included with every bond issue and every bond issue itself subject to careful scrutiny. The business of spreading and collecting taxes and of recording delinquency should be systematized to reduce expenditures to a minimum. Those portions of the judiciary and public welfare service that are local in nature should be reorganized on an efficient basis. Every community employee should eventually be hired and fired by the county manager on the basis of the quality of his work and not on his vote-getting power.

However, while the adjusted county unit will be the center of all local self-government, there now are many public functions performed by these units that are of state-wide interest and nature, and that should be performed largely by the state. For example, it is very probable that equitable valuation of property for tax purposes will not be achieved until the state tax commission is empowered to appoint valuation engineers, one for each county. It is well recognized by all tax experts and it has been repeatedly demonstrated, that local elective assessors have not the requisite training to value all property correctly, and that even in those types of property that they could assess fairly, politics and personalities prevent an equitable valuation between classes of property in different assessment districts. In Florida, data on five forest counties show that improved land is assessed at 29 per cent of the sales value and unimproved land at 53 per cent, or nearly twice as high. A compari-

son of unimproved land sales in these counties shows that in one county the ratio of assessed value to sales was as low as 36 per cent and in another 81 per cent, over twice as high.<sup>4</sup> Those who know how superficial assessment practice usually is are surprised that the inequities are not greater. In many southern states there really is no true assessment, the assessor usually accepting the tax payer's list without question. One Louisiana tax payer with a conscience told me that he never swore to his list (although required to do so by law) because he knew it was not the full value of his property.

It is furthermore likely that the protection of life and property can be more effectively handled under expert statewide direction than even by an appointed county manager to say nothing of the present arrangements whereby we elect our sheriff on the basis of his political power rather than his knowledge of criminology. Highway maintenance and financing may also eventually find their way under state and federal control, as has already been the case in North Carolina. Although we must admit that there has been a tremendous improvement in highways since the automobile became a part of our daily life, still it is probable that most communities have their tales of the inefficient use of highway funds. For instance, roads are inspected in some counties of Mississippi whenever the supervisors need some ready cash and vouchers for work on the roads are submitted without a description of the type of work or actual time employed.

Probably it is in the realm of public education where improvement in organization is most urgently needed. Local school boards should be abolished in favor of the adjusted county unit. Today, school funds are raised and expended by a great many small boards, who, even

when actuated by public interest, are handicapped by ignorance of pedagogy and by small-unit inefficiency. Local school funds should be levied by the elective county board and expended by the county superintendent, a local official appointed by the state department of education. In small counties, it may be possible to secure a county manager who could also perform the duties of school superintendent. The school superintendent should be responsible not only for the proper and equitable disbursement of school funds, but also for the quality and character of the education dispensed in the schools. His term of office should depend only upon the proper performance of his duties as determined by the state board of education. Such an office would be able to plan and fearlessly carry out educational reforms which would lead to as high an educational quality as budget limitations would permit.

School budgets will in the future be based upon the policy to supply the essentials of education in an adequate but not sumptuous way. On this basis, it is even probable that school budgets will in some districts be decreased, or at least if not decreased, the educational quality will be improved at the expense of ornate buildings and other non-essentials. Rural communities when opposed to consolidation (as they often are) have usually taken that position because of the expenses of other communities where ambitious educators, blinded by the desire for better schools, brought about consolidation but in doing so increased the total school costs to a point where these costs are more than the community can bear. The lack of balance cannot continue.

Education is clearly one of those functions that will soon be controlled and financed largely by the state and federal government. In a democracy more than

<sup>4</sup>J. J. Goulden—Florida's Forest Land Problem. Bulletin No. 6, Florida Forest Service.



other forms of government, we are dependent on the intelligent exercise of the ballot. The rural pupil of today is the father of tomorrow who through ignorance gathered may unwittingly upset or retard much needed social, economic, or political reform. And even when the right to vote is denied or not exercised, the poorly educated, and perhaps unprincipled child, may in coming years endanger our institutions by his lack of proper training.

Usually a community is poor simply because it does not possess natural or accidental advantages possessed by other communities, and the proper educational training for children who happen to be born and reared in such a community can only be secured by state aid, aid from the wealthier communities within the state. Indeed, there is no good reason why educational support should stop at state boundaries. Professor MacDonald's<sup>5</sup> recent exhaustive study of federal aid shows clearly the value of such aids and suggests that they be increased. Federal participation in education would generally lead to greater aid to rural communities in the poor sections of the country. The underlying motive behind the opposition to the governmental financing of education, ever since the days when the question was whether there should be any public schools at all, has been one of selfishness; in the colonial days one's childless and wealthy neighbor objected just as strenuously to helping support public schools as our wealthy urban centers and states now object to aiding those regions not possessing the same natural or accidental advantages.

The reforms thus far mentioned will most assuredly bring about a much more economical and very much more efficient administration of public business. However, it is probable that while the demand for more and better public services

will, for a time at least, not offset the saving that can be secured by a business-like administration of local public business, still it is probable that public clamor for increased services will usually prevent any very material decreases in the total cost of rural local government. Hence, comparatively little relief can be expected by property owners under the property tax unless a larger share of the public burden is shifted to other forms of wealth.

Fortunately, there is no reason why real property should continue to bear such a predominant part of the costs of governmental services and practically all economists agree with the National Tax Association that the personal income tax should be made a cornerstone of the modern tax structure. Some of our states, including such southern states as Arkansas, Georgia, Mississippi, Missouri, North and South Carolina and Virginia, have in recent years enacted income tax laws, and it will only be a matter of time before the rest of the states in the Union fall into line.

The personal income tax is usually considered one of the most equitable forms of taxation. It is a tax based distinctly on ability to pay and it is considered more difficult to shift than most other taxes. Indeed, the question of equity is seldom raised, the principal points of controversy being in reference to the minimum taxable income, basic rate and its progression, and the use to which the revenues secured should be put. It is possible that the minimum taxable income of \$1,000 for the single person and \$2,000 for the head of a family, which now appear in most of the income laws of the southern states, will eventually be considered a trifle high, but it is more likely that drastic increases in the rate and rate of progression will be a trend in income tax legislation

<sup>5</sup>Austin F. MacDonald, *Federal Aid—A Study of the American Subsidy System*, 1928.

However, it will only be economically feasible to increase income tax revenues materially after all competing and adjoining states have accepted the principle, or otherwise a high income tax may drive income tax payers to a neighboring state having no income tax law.

In addition to the income tax, the states will, in the future, realize much more from inheritance tax and the gasoline tax, paid by the users of the roads, which will finance most of the road expenditures. These three forms of taxes will remain state sources of revenue; the adjusted county will rely on the property tax for its funds.

Now what has all this to do with forestry and forest taxation? I believe these changes embody the basic and principal solution to the forest tax problem. Efficient government will reduce public costs somewhat, and a more equitable distribution of the tax burden by the introduction of income and inheritance taxes will materially reduce the burden upon rural real estate, and hence, upon forest property. Roads and schools are now the principal item of local governmental costs. Bring greater efficiency into these public services and have them largely financed by the state as a whole from other sources of revenue than the general property tax and the local burden could be decreased 75 per cent. Then secure an equitable valuation of forest property under the property tax and the burden on cut-over lands will be still further decreased. It is not at all beyond the realm of possibility when all these reforms have been applied, that the annual tax on cut-over land in the average forest community will be less than five cents an acre.

The feasibility of enacting measures to bring about the reforms just discussed is not nearly as poor as that of enacting

any far-reaching class legislation such as foresters have dreamed about and wasted their efforts on for the last thirty years. It is illogical, and politically impossible to find a permanent cure for the crushing public burden now placed upon cut-over forests without viewing the problem from the community point of view. Foresters have generally considered the forest tax problem as strictly a forest problem. They would decide that taxes were too high on forest property and forthwith would make plans to lower them to whatever level they thought would encourage the practice of forestry. Over fifty forest tax laws have been placed on the statute books, each one confidently offered as *the* solution. Most of these laws have been suffered to remain in force simply because they have been inoperative and all of them have applied to a very small fraction of the forest land area. Of the three southern states with such laws, Alabama has two-tenths of one per cent of its privately owned forest land classified, Mississippi not an acre, and Louisiana 2.1 per cent.<sup>6</sup> These laws, in their failures, they have not brought about the practice of forestry on the privately owned forest land within the states in which they operate.

But that is not all. The forest tax laws have done considerable to retard the practice of forestry. A forest tax law is proposed; it is endorsed by the profession as an encouragement to forestry and hence receives the support of the conservation interests. These interests pass the bill with much enthusiasm. The work is done; forestry is now a reality; they have given the forester what he wanted and needed, and now he can go ahead and practice forestry. When they later discover that the law has not helped them they are apt to lose patience and confidence in the foresters who advised and encouraged their efforts. For these reasons

<sup>6</sup>Digest of the Forest Tax Laws in the United States in effect October 1, 1931, U. S. Forest Service, Forest Taxation Inquiry, Progress Report Number 16.



ns, it should behoove foresters to approach all problems on which they cannot be considered experts, such as forest taxation, with considerable care. Let us

study such problems carefully and seek the advice of the specialist, and then let us not be carried away by either enthusiasm or politically impossible theories.

## COMMENTS<sup>1</sup>

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Professor Herbert has developed his subject in a rather interesting and unique manner. He has discussed the important phases of his subject and pictured some of the difficulties which the forest-interested person must face. While there is some speculation involved in this paper, which necessitates the expression of opinion, there is basic information upon which conclusions can be drawn. On the whole I am inclined to agree with Professor Herbert's statements and I believe you concur in his opinions and conclusions. My discussion of his paper contains only additional data and personal opinions, and these are given merely to substantiate the conclusions he sets forth.

For several years, I have been of the opinion that foresters in the South have been working against an almost irresistible force in attempting to promote private practice of systematic forestry. There are several dominating forces that tend to discourage private enterprise in forest production. First, there ever present the element of human impatience that deters forest production. Man is so constituted that he looks forward to results in a relatively short time. He makes his investments with the idea of relatively quick returns. The growing of trees is a long-time program and few have the courage to plant and

wait for returns. In the second place, there are too many alternate opportunities for investments that have the promise of quicker and surer returns. When forest products sell for prices high enough to offset the disadvantage of waiting and the advantages offered by other forms of investment, private enterprise will become prominent in forest production. Again, there is the problem of interest rates. High interest rates are not conducive to tree planting. To practice forestry means outlay of cash and the use of otherwise productive labor. To compound the interest rate, as our southern land owners know it, for a period of from 15 to 25 years on the investments involved in forest production, one sees little possibility of forest returns covering this and the other necessary charges when present prices are considered. Then, there is the problem of taxation. While there should be no good reason for taxing growing trees any more than taxing other growing crops, yet the heavy tax burden apparently has been responsible for the rapid clearing of our forests, and no doubt has been a deterrent to tree planting in the southern states.

The results of these forces, when combined, lead to the conclusion that when forestry practice is put on a larger scale in the South, it will be a

<sup>1</sup>Presented at the 31st annual meeting of the Society of American Foresters at New Orleans, La., Dec. 29-31, 1931.

public and not a private enterprise. The element of impatience is not pronounced in governmental organizations. These are perpetual and time is no consideration. Immediate returns are not necessarily sought. The interest rate does not deter and the problem of taxation is not an important factor except in a negative way. As I see it, the one hope for developing a real forestry program in the South is to expand the policies of the federal government, and to formulate very definite policies for state and local governmental units where by forestry work will be carried out on a large scale.

The above discussion is based on observation and facts here in Louisiana. From 1920 to 1929 over \$6,000,000 worth of land has been adjudicated to the state; this sum represents the assessed value of land. While I have not segregated these lands according to class, I do note that a large per cent involves cut-over lands. During the past two years large tracts of land, involving thousands of acres of cut-over lands have been permitted to become tax delinquent. For example, Vernon Parish land owners permitted 127,117 acres of land to go back to the state in 1930. This land represented a total assessed value of over \$3,000,000 and practically 98 per cent of it was cut-over land and land on which the timber was owned by another party. Vernon Parish is a typical cut-over pine parish.<sup>2</sup> The trend is definitely upward in number of acres becoming delinquent. The holders of large bodies of land are either relinquishing their claims to the cut-over lands or are considering it seriously, especially in those areas where the tax burden is unusually heavy. It is surprising that the owners have paid the taxes on these lands for as many years as they have. It is probably true that

they have held on in anticipation of oil and gas developments, or federal or state purchase for forest purposes. There is some hope for these cut-over lands to be developed where the present owner is a large saw mill corporation and where there is sufficient timber available to keep the mills going until new crops can be grown, but where this is not the case, the southern states need to prepare to become important land owners within the near future.

Much has been said about high taxes being responsible for the retarding of forestry work. This, as I have stated above, is only one of the forces. Let us examine for a moment the tax situation and changes that have taken place during the past few years in Louisiana. Only one-fifth of the taxes paid is for state purposes and of this amount 36 per cent is used for state administrative purposes. The balance is used to support the state school system, Confederate Veterans, and the like. The other four-fifths is collected for parish and local purposes. When all assessments, all taxes, state and local are combined for the years 1920 to 1929 total assessments have increased only 11 per cent during this period. The total amount of taxes paid, excluding city and town taxes, New Orleans excepted, has increased 28 per cent. State taxes alone increased 17 per cent, and local taxes increased 31 per cent. This indicates that local taxes are demanded by the local people and in some instances are the results of the activities of the large land owners. Better schools, better roads and more efficient health units tend to attract the home seeker. The large land holder has favored special taxes for these purposes in order that land development projects may be carried out. As a result extra heavy taxes have been voted and developments have not gone forward to the extent of permitting the unloading

<sup>2</sup>In Louisiana the parish is practically the equivalent of the county of other states.—Editor.



lands as had been anticipated. A good sample of changes in taxes paid is found in Vernon, Beauregard and Union parishes, three cut-over pine parishes. Taking 1913 as a base representing the average tax per acre in the three parishes 100 in 1913, in 1930 the index was 313. This means that taxes in these parishes have more than quadrupled during the past 18 years.

Professor Herbert has emphasized the importance of greater efficiency in government, especially local government, and a more equitable distribution of the tax burden. Our southern states would find it advantageous to give careful attention to these two problems. The increasing tendency for lands to become delinquent resulting in losses of local and state revenues, which in turn results in increased tax burdens for the remaining taxpayers together with increased demands for public revenue; the ever narrowing of time between county and parish centers through road developments; the demand on the part of every parish and county for the unusually large number of paid functioning groups regardless of size or financial condition of the political unit, all these lead to the conclusion that consolidation is inevitable. However there is a number of complex problems to be faced in county consolidation, and the movement will necessarily be slow.

To abandon the general property tax as the major source of local revenues, would be inadvisable; however, it seems to be general opinion that tax revision is in order, and that the property tax for these purposes is antiquated and must be adjusted to meet the new economic situation. Professor Herbert has suggested the personal income tax as a method of relief. The income tax when properly administered certainly has many points in its favor. However, where an income tax becomes the major source of revenue

for the state, there is danger of the state revenue becoming unstable due to the fluctuation in personal income from year to year. This criticism can be met by making our financing flexible enough to off-set bad years with surpluses brought over from good years.

Throughout the paper under discussion we find the implication and statement that the state should assume more of the functions that are now taken care of by parish and county units. I would emphasize one point in connection with this phase of the discussion. When the state takes over the function of road building, schools, and the like, it is not enough that the state bear the burden from this point, but I believe the obligations of the parish units should be assumed where these obligations were made to provide the facilities the state takes over. In other words, the progressive parish that improved its road system, built modern school plants, and made other developments of a permanent nature on the basis of bond issues, should not be penalized by leaving this burden on it, and at the same time be called upon to contribute its share to the future state program while the old debts are being paid.

I fully agree with Professor Herbert in his criticism of the system of assessments. I have had the opportunity recently to look into the assessment problem of Louisiana. In this state properties are assessed at 100 per cent of their true value according to law and this value is looked upon as the price at which a piece of property will sell in the open market. Florida's case is not different from that found here in Louisiana. It is possible to find in this state woodlands assessed at twice the value of the best class of agricultural lands on a given farm, and woodlands do not mean timber lands. The ratio of assessed value to selling value of real estate varies from parish to parish great enough to make it possible

for some parishes to contribute twice as much to state support as some others based on equal taxable wealth. The same lack of uniformity exists between properties of the same class within a parish. We need a rigid classification of the lands in Louisiana and an expert body free from political influence to appraise them at regular intervals if the assessment problem is to be solved.

We can not place the defects of our organization and financing system at the feet of any individual or any group of individuals; the trouble is inherent in the system. The actual increase in dollar taxes in Louisiana was a little over ten million from 1920 to 1929. If we deflate

the total taxes paid each year for the above period by using the all-commodity price index and build a new index with 1920 as a base we will find that the actual purchasing power, paid in the form of taxes increased from 100, in 1920 to 202 in 1929.

Regardless of future developments in forest production, whether private or public, we certainly agree with Professor Herbert's concluding statement that the forest problem is not a problem with which any one group is to deal. It is a problem that concerns us all, and very close coöperation should be maintained between the various groups so far as the search and formulation of policy is concerned.



Humidity, usually spoken of as "relative humidity", is the ratio between the amount of moisture in the atmosphere and the amount which could be present at the same temperature and under the same pressure. When the air has taken up all the moisture in the form of water vapor that it can contain at a given temperature it is said to be "saturated", or to have a relative humidity of 100 per cent.

Low relative humidity, or the dry condition of the air, affects the forest cover and renders the leaves, needles, dry wood, and ground litter more inflammable and so creates increased fire hazard. Hot days are not necessarily dry because the air may contain sufficient moisture to raise the relative humidity and render the weather sultry and oppressive. On the other hand, a cold day may be caused by a dry north wind that contains little moisture, which will lower the relative humidity and cause dangerous fire conditions.

Forest Service officers are equipped with sling-psychrometers with which they are able to determine the relative humidity during the fire season at any time or place.

*Forest Rangers' Catechism.*



# WISCONSIN'S COUNTY FOREST PROGRAM<sup>1</sup>

By F. G. WILSON

*Wisconsin Conservation Commission*

In Wisconsin, tax delinquent lands revert to the county instead of the state as is the case in Michigan. This complicates the problem of attaching a destiny to these lands. With the new county forests being established, the total will exceed 400,000 acres in 1932. How Wisconsin is trying to solve this problem by county surveys and state aid, and what has been accomplished to date, is told by the author.

A WAVE OF tax delinquency is submerging the northern portions of the Lake States. Railroad logging developed in this region and large scale clear-cutting operations left tremendous areas of cut-over and idle land. In the older timber sections of the east such large tracts of cut-over land never appeared. In the south and west the carrying charges of taxes and interest on the investment in land have not been accumulating for a sufficient period of years to cause such widespread tax delinquency.

When land is held for sale but brings no income with which to meet carrying charges, the owner's investment increases beyond any reasonable sale value and he finally stops paying taxes and drops the land. As tax delinquency grows, it increases further dropping of land both by concentrating the tax burden on fewer owners and by lowering the value of similar land in the vicinity, so that the incentive for carrying lands disappears. It is true that in some states taxes are a lien on the owner rather than on the property, but this can be evaded. In any event it cannot be effective beyond the point where the owner becomes bankrupt. It is now generally acknowledged that these cut-over lands are not going to be taken up for farming. Most of it is unsuited for agriculture, and in fact much of it represents abandoned farm

land or lies within defunct drainage districts. Prices on this land are doubtless below its value for forestry, one paper company having bought 15,000 acres within trucking distance of its mills for 25 cents per acre. Only in one state is the U. S. Forest Service buying land at a lower price than in Michigan and Wisconsin. However, the area is so vast that purchase for federal forests or for private forest enterprise is not solving the problem.

Consequently tax certificates are accumulating. The laws of the states differ in specifying which unit of government shall take the unsold tax certificates and eventually acquire tax title to the land. In fact, replies from several state attorneys-general reveal that the procedure is not clear or that the laws do not provide for eventual acquisition through tax deed by the state, county, or town. In Minnesota tax certificates are held in trust for the taxing units, and since the certificates do not find buyers, title does not pass to any agency. Even here, however, it is obvious that these lands are public lands. As so aptly expressed by Professor B. H. Hibbard (4) of the University of Wisconsin, "whether we would wish it or not, a new public domain is appearing as the result of tax delinquency."

Those states which have followed Michigan and Wisconsin as leaders in lumber production may profitably study

<sup>1</sup>Presented at the annual meeting of the Society of American Foresters at New Orleans, La., Dec. 31, 1931.

the efforts of these two states to solve their problems of tax delinquency and to attach a destiny to this "new public domain." The approach has necessarily been different for the reason that tax delinquent lands revert to the state in Michigan and to the counties in Wisconsin. Consequently Louisiana, Mississippi, Arkansas, and Florida will find the work of Michigan most helpful, while Montana, Idaho, and Washington should profit by studying Wisconsin's efforts.

The situation in Michigan has been graphically portrayed. (2). In Wisconsin the economic pressure on counties in the cut-over sections has been even more serious for the reason that the counties have been receiving the tax certificates instead of money, while in Michigan the shortage in the tax levy represented by tax certificates was a state burden and therefore largely borne by the counties with greater taxable wealth.

The work in Michigan is well known. There the department of conservation selects from the tax deed lands those tracts which constitute desirable state forest land and which give promise of blocking-up into sizable units. In their selection of lands they are guided by the work of the Land Economic Survey, which has mapped and compiled a great mass of physical and economic data. Thus a well considered state forest program is going forward without the need of appropriations for land acquisition.

In states where the land is reverting to the counties the problem is more complex. Even the land-use surveys must be modified, aiming not to compile a mass of data for use by technical men, but to present significant facts which will be of value to county boards of supervisors in taking action along certain definite lines. The study made in Lincoln county (3) not only presented valuable information but was extremely helpful as a guide on conducting future surveys. Then followed

a series of county surveys, each made at the request of the county board, with coöperation of the county and several state agencies, and published as special circulars of the Agricultural Extension Service. The first of these was "Making the Most of Marinette County Land." Constructive action has resulted from the report and while progress has also followed the publication of the succeeding surveys, Marinette county is still leading as a result of the earlier start.

A study of tax delinquency (1) reveals that, following the tax sale of 1927, counties held one or more tax certificates on 2,116,235 acres of which 492,642 were deedable to the counties, while 183,000 acres had already been acquired by county tax deeds. The procedure in the counties varied widely. Some sold tax certificates to the land owners at less than face value in their efforts to keep lands on the tax roll, while others took deed promptly. Langlade county went farther and instructed the county treasurer to bid in all tax certificates in behalf of the county and to out-bid others. This was done on the sound theory that the county might as well take the good with the bad, permitting original owners to redeem when they desired and securing the 15 per cent penalty to the county.

Other counties delayed in taking deed until the accumulation of tax delinquent lands in some towns was so great that not even all of the town levy was collected. This resulted in so called "excess delinquency," the town having a claim on the tax certificates up to the amount of shortage on the town levy. Since taking of deed required payment of the "excess delinquency" to the towns by the county, and the counties were financially unable to make these payments, they refrained from taking deed and condition grew worse each year. Actually this was a penalty on those counties which had



begun to take deed as soon as delinquency became serious.

It became increasingly evident that the counties needed greater authority to meet their responsibilities and remain financially solvent. Judge Charles D. Rosa of the Wisconsin Tax Commission had pointed out (5) that intelligent levying and budgeting of county funds could not be done when working with a fictitious assessment base. Furthermore, these annually delinquent lands represent watered stock in the assessment base, which could be squeezed out only by taking deed so that the lands would be taken off the tax roll.

During the past three sessions, the following legislation was enacted: (6).

1. Excess delinquency as an obstacle to the taking of tax deeds was disposed of by postponing payment to the towns until income was derived from the sale of the land or timber from the land and the county's liability was limited to such extent.

2. Counties were authorized to create county forests and enter them under the "Forest Crop Law" to secure to the town "state's share," the state to take a 75 per cent severance tax as with other lands.

3. During the last session this was amended to provide for payment by the state of an additional 10 cents per acre annually, this to go to the county to be expended for the development of county forests, the state to take 75 per cent as a severance tax and to approve the cutting of timber.

4. The county zoning law was amended to authorize zoning for agriculture, forestry, and recreation. Zoning of county-owned lands does not require approval of the towns in which the lands lie.

5. Counties were authorized to exchange lands either to block county forests or to expedite zoning.

6. To date zoning for agriculture and forestry

has been limited to definite policies for the sale or management of county lands. At least eight counties are operating on all or most of the following principles:

1. County lands should be sold for their worth rather than for the face value of the tax certificates on which they were acquired.

2. Land may be sold to an adjoining farmer or to a new settler when located near roads and schools, and when the land is suited for farming.

3. Land for agricultural settlement should be sold only to responsible parties to avoid bringing into the county people who may become public charges.

4. Lands sold for recreation property need not be located near roads and schools, since good roads are not needed and the property is not occupied during the school year.

5. Land should not be sold where it appears that the timber will be cut and the land again permitted to become delinquent.

6. Blocks of land primarily valuable for forestry may be sold if they are to be managed as forest property or they may be used for establishing county forests.

Two counties have also exchanged land to relocate settlers, thereby saving school costs of \$360 to \$450 annually and also saving on road costs.

With respect to county forests, progress can best be illustrated by the case of Marinette county. In 1927 this county owned 83,244 acres of tax deed land, while an additional 136,878 acres was deedable. Except for the formality of taking deed, the county virtually owned 220,000 acres, or 24 per cent of its total area. In 1928 the county board requested help in conducting the land use survey which was published in May 1929. Following the enactment of remedial legislation more deeds were taken. Early in

1930 the first county forest of 13,940 acres was established and entered under the forest crop law. This year the boundaries of the first forest were extended and three new ones established. These include 88,193 acres of county-owned land or 55.5 per cent of the gross area. Considering that this county has tax deeds on many other scattering descriptions, it is clear that orderly planning and good faith are behind the program, and that it is not merely a device for securing state aid funds.

Thus far, management of these forests has been limited to stopping timber trespass. The county surveyor has been employed and his collections on timber cut from county lands have largely defrayed this protection cost. With 10 cents per acre from the state, a modest program of management and planting is assured for next year. Since the appropriation is for the care and improvement of these forests, a program of budgets and accounting is indicated. The conservation commission will provide technical assistance in preparing and carrying on management and planting plans which are to be acceptable to both the county boards and the commission. Planting stock from the state forest nursery will be provided, though county forest nurseries may prove desirable where large areas are to be planted. To further the exchange of county-owned land outside for privately-owned lands inside the boundaries of county forests, a beginning should be made in examination and valuation of tracts for such exchange.

Presumably some of the funds will be allotted for fire line construction and other supplementary forest protection work. This should result in a reduction of the counties' bills for fire suppression, for in Wisconsin suppression costs are paid by the state and half of the sum charged back to the counties.

During the present year one camp has been operated to test the use of prison

labor in the construction of roads and fire lines. Only prisoners with good records were eligible for this camp, while they work under an un-armed guard. Unsatisfactory conduct results in a return to the prison. The purpose of this project is to secure wholesome employment for prisoners at a cost equal to the interest on investment otherwise required for new prisons. Should further trial warrant an increased use of prisoners, county forests may get contributed labor from this source.

An interim legislative committee on delinquency is now gathering maps and figures on the acreage in county ownership and in various stages of tax delinquency. Until this information is compiled, we can only guess at the acreage involved. With the 124,000 acres of county land now registered and with applications for entry of 344,000 acres pending, the 400,000 acres mark may be reached in 1932.

To those who favor national and state forests, this county forest program may appear a complicated and cumbersome procedure. Yet these are virtually state forests for which the counties contribute the land and receive 25 per cent of the gross returns just as they would from national forests.

Few states have the taxable wealth of New York and Pennsylvania so that they can purchase the land. Since we do not have large areas of public land, the purchase by the state would not especially advance better forestry practice. If it is, the state appropriation will be useful for their reforestation and improvement which is after all the real objective.

Progress may be slower because it requires the coöperation of the county. Much work is required to win local support, but the educational effort required to secure local understanding of the project is not wasted. If we believe in government by the people, there is more



establishment of public forests than merely to "put over" the project.

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COMMENTS<sup>1</sup>

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We are all greatly indebted to the foresters and economists of the Lake States for the valuable work they have accomplished, and are now carrying on, in the field of land utilization and its attendant problems. Mr. Wilson's paper on "Wisconsin's County Forest Program" deals very clearly and interestingly with one of the most important phases of that field, namely, the problem of what to do with lands reverting to public ownership through tax-delinquency. That this problem is one of vital interest not only to the Lake States but to the South as well is being more clearly recognized as we delve into it further. We who are engaged in a similar study in the Gulf States are very grateful for the survey in the Lake States, on which we can draw for inspiration, as Mr. Wilson suggests. Wisconsin's approach to the problem of tax delinquency is a very logical one. Hence, under her laws, title to tax-delinquent lands passes to the county rather than to the state, nothing could be more logical than her practice of blocking such lands, where suitable for forest growth, to county forests on which the state

pays an annual imbursement of 10 cents an acre for development, and receives a 75 per cent severance tax on the sale of mature timber. This process, of course, is applicable only to lands in blocks large enough for practical management, but through the provision for exchange of lands between the county and private owners, it has apparently worked out to the advantage of all parties concerned, so far as we can judge from the short time it has been in progress.

There are, however, some points raised in this paper that seems to require further comment. It was stated that "When land is held *for sale*, but brings no income with which to meet carrying charges, the owner's investment increases beyond any reasonable sale value and he finally stops paying taxes and drops the land." It is not exactly clear just what the speaker meant by "held for sale." If he implied that *all* land is for sale at a price, his statement is, of course, correct. If, however, he meant that only land held for speculation is liable to tax-delinquency, his statement is not broad enough. If rural land is held for *any*

<sup>1</sup>Presented at the 31st annual meeting of Society of American Foresters at New Orleans, La., December 29-31, 1931.

purpose—farming, timber-growing, recreational development, even mineral development, but does not earn sufficient income to pay carrying charges—the end result is usually its reversion to public ownership for tax delinquency, unless, of course, the owner can find a purchaser who believes that he (the purchaser) can make the land produce such income.

In the discussion of recent Wisconsin legislation, it was stated: "Excess delinquency as an obstacle to the taking of tax deeds was disposed of by postponing payment to the towns until income was derived from the sale of the land or timber from the land and the county's liability was limited to such income." While this law does undoubtedly remove the previous obstacle to the taking of tax-title by the county, it does not appear certain that it has "disposed of" the problem of excess delinquency, but rather to have shifted it to the towns. Under Wisconsin law, the towns, having collected all general property taxes possible, are permitted, after paying over the school tax and the town's share of the state tax, to discharge all their own local obligations before paying any of their share of the county taxes. In cases where excess delinquency has reached the point where not even all the town levy can be collected, as was stated to be the case in some towns, it would seem that for the county to take title and thereby, in many cases, to discharge completely its obligations to the town (since income from, or sales of, such lands are infrequent) would merely increase the burden of raising local revenue in the town concerned. This is partially, perhaps entirely, overcome, to be sure, by the registration of the county lands thus acquired under the "Forest Crop Law," thereby securing to the towns the "state's share" of taxes originally paid by the county to the state. In cases where lands are not so registered, the town would be no better

off than before the passing of title to the county.

Langlade County's policies were cited as an example of the state's approach to this problem in the northern counties. The first of these principles was stated as follows: "County lands should be sold for their worth rather than for the full value of the tax certificates on which they were acquired." (This refers to the reversion to private parties of land taken by the county for tax delinquency.) While this policy is undoubtedly the logical procedure in many cases, it would appear that, when lands had been acquired after reaching the "excess delinquency" status, the face of the tax certificate would be greatly in excess of the true market value of the land, and that its sale at the latter figure would result in a considerable loss to the county revenue. Progress Report No. 12 of the Forest Taxation Inquiry, by R. C. Hall, entitled *Assessment Ratios of Forest Property and Other Real Estate in Wisconsin* (U. S. Forest Service, November, 1930), gives some pertinent data on Langlade County (Table 13). The assessment ratio is defined as the ratio, expressed in per cent, of the actual assessed value as listed for taxation to the full market value as determined by the consideration received for the same property in free and unforced private sale. Theoretically, under Wisconsin law, the assessment ratio on farm properties is 100 per cent, i.e., "the estate shall be valued . . . at the full value which could ordinarily be obtained therefrom at private sale." (Wisconsin Tax Laws, Section 1052, page 71. 1920.) In practice, however, no such policy is carried out. For instance, the assessment ratio on farm property in Langlade County is 68 per cent; i.e., the assessed value is 68 per cent of the full value. Little of this property comes into county ownership through reversion. On other over lands, however, the assessment ratio



used on 144 sales involving 16,823 acres, is 123 per cent. The total assessed value of this acreage was \$113,476; the market value was \$92,427. It is this type of property which most frequently comes to the tax-delinquent class and into county ownership. If, then, these lands are taken by the county at a valuation of \$113,000 and sold for \$92,000, the county loses 23 cents on every dollar involved in the sale price. This situation is, of course, not the same in all the northern counties, yet cut-over land is overassessed in 10 of the 18 northern counties, and the assessment ratio of this type of land in all 18 counties is 103 per cent, varying from 73 per cent in Florence County to 140 per cent in Ashland County. The average assessment ratio for all town property in the 18 northern counties (exclusive of village and city property) is 68 per cent (Progress Report No. 12, Table 5). It should be borne in mind that this ratio bears no direct relation to tax-delinquency, being merely the relation of assessed value to true value. If to overassessment of cut-over land is added possible excess delin-

quency thereof, the gap between the value on the county books and the realized sale value is further widened. That the county realizes this is evidenced by the other principles enumerated for Langlade County. In cases such as we have discussed, it would seem to be better for the county to retain title and develop the property as a county forest. We are not here recommending that land be sold for more than its true value, even if that were possible, but merely that, where land has been taken for excess delinquency, the title remain vested in the county, rather than again passed to private hands.

The development of such forests in Marinette County and subsequently, I understand, in other counties, cannot be too strongly commended. We are faced with the necessity of action rather than theorizing and such action as has been taken in Wisconsin gives good evidence of being the right course taken at the right time. There are, of course, many problems connected with this policy which await solution, but a start has been made and the other problems will be solved as they arise.



*Are the national forests a financial burden on the State and counties?*

No. A detailed study of the effects of national forests on State and county revenues, conducted by the Forest Service during the years 1927 and 1928, showed that the national forests under the present form of administration are contributing to the State and counties \$346,000 more per year than would be received if the potentially taxable Government land in the forests were in private ownership. This yearly contribution will steadily increase as the national-forest resources come to be more fully utilized under an economic process of development.

*Forest Rangers' Catechism.*

# SOME ASPECTS OF THE FOREST PLANTING SITUATION IN THE NORTHEAST

By C. EDWARD BEHRE

*Director, Northeastern Forest Experiment Station*

For every five acres of farm land being abandoned each year in the Northeast only one is being reforested. Assuming that a large part of such idle land should be returned to forest through planting, the progress now being made is not satisfactory. The diversity of practices in the several states of the region indicates uncertainty as to the best course to pursue. More adequate knowledge of planting principles and methods and of possibilities of reducing costs would go far to stimulate additional planting and assure success to reforestation already under way. The author discusses the enormity of the job and the problems that require immediate study.

**A**LTHOUGH the Clarke-McNary Law of 1925 gave a new impetus to forest planting throughout the country and the tremendous program of land acquisition for reforestation being initiated in New York has focused attention on planting activities there, the magnitude of the task of reforestation in the Northeast is not generally recognized, and the adequacy of present methods of handling the job of planting is open to serious question.

An attempt to present some figures on the situation with suggestions on the need for more research on the subject may prove helpful.

## ABANDONMENT OF AGRICULTURAL LAND CONTINUES AT AN INCREASING RATE

The area of improved land on farms in the Northeast was at a maximum about 1880. From this time until 1900 rapid abandonment of northeastern farm land was coincident with the opening up of the West. With the subsidence of the western exodus the rate of land abandonment was greatly reduced in the early years of the twentieth century, but

changed economic conditions in recent years have again stimulated it.

The causes of this are manifold. Fertility has been depleted. Poor, rough lands and farm units broken up into small fields are not adapted to use of modern machinery and methods. Intensive production on best lands is proving the most profitable type of agriculture. Increased difficulty of marketing agricultural products in small quantities has been one phase of the modern tendency for mass production and chain store merchandising. These are some of the factors which have contributed to the present situation along with the more generally mentioned high wages and short working hours in industrial pursuits.

The abandonment of land in the Northeast as indicated by the United States Census figure of improved area in farms from 1880 to 1930 is shown in Table I. In this fifty-year period almost twenty-two per cent of the entire land area of the northeastern states was abandoned for farming. From 1925 to 1930 more than 200,000 acres were being dropped from productive farm use each year. The

<sup>1</sup>The classification of land in farms was changed after the 1920 census. The term "improved area" was dropped and a more detailed classification adopted. For 1925 and 1930 the area of plowable pasture was added to total crop land to get a figure comparable to former "improved land" classification. For this reason there may be some error in the change indicated between 1920 and 1925.



situation is most serious in New York at present, but this is partly due to the fact that the abandoning process is more nearly complete in New England where the topography is more rugged, and forest lands constitute almost three-fourths of the total land area.

#### FOREST PLANTING TO DATE INSIGNIFICANT COMPARED TO JOB AHEAD

In Table 2 an attempt has been made to present a picture of the size of the reforestation job in the Northeast in relation to progress already made.

It is very difficult to secure any reliable figures on the area of land which must be restocked by forest planting in order to restore it to productive use. Although considerable portions of the abandoned farm lands restock naturally to forest growth about half the total abandoned area is estimated to be in need of restocking. To the abandoned farm land must be added severely burned-over or cut-over woodlands which have failed to restock naturally. Estimates by the state foresters of the region place the total area in need of reforestation at 7.25 million acres. These estimates do not in general include areas partially stocked naturally or stocked with shrubby growth and weed species, since it is generally considered impractical to plant such areas at present. These poorly stocked or brush and weed areas are in reality non-productive, and will need some form of artificial reforestation to put them into productive use. To do this in a practical way is one field for study.

Up to 1930 only about 340,000 acres have been planted in the Northeast. This is only about four per cent of the area needing planting. These figures are derived from the number of trees distributed each year and take no account of plantations which have failed. A compre-

TABLE 1

LAND ABANDONMENT IN THE NORTHEAST (REDUCTION OF IMPROVED AREA IN FARMS)

	Rate of abandonment (Acres per year)						Total area abandoned 1880-1930 acres	Total land area, state acres	Percentage of state abandoned per cent
	1880-1890	1890-1900	1900-1910	1910-1920	1920-1925	1925-1930			
Maine	44,024	65,772	2,623	38,333	27,609	35,651	1,823,878	19,132,800	9.5
New Hampshire	58,072	65,051	14,769	22,628	14,077	20,796	1,779,575	5,779,800	30.8
Vermont	63,052	52,932	49,266	-5,763 <sup>1</sup>	57,944	-64 <sup>1</sup>	1,884,265	5,839,400	32.3
Massachusetts	47,129	36,489	12,763	25,567	27,263	9,356	1,402,572	5,145,000	27.3
Rhode Island	2,400	8,714	901	4,549	4,651	1,228	195,025	682,900	28.6
Connecticut	26,277	31,489	7,627	28,717	12,349	16,182	1,083,757	3,084,800	35.1
New York	132,848	78,939	75,595	168,526	398,115	127,600	7,187,693	30,498,600	23.6
Northeast	373,802	339,392	163,545	282,557	542,007	210,757	15,356,765	70,163,300	21.9

<sup>1</sup>Increase in improved area.

hensive check on the success of plantations for the region is needed.

For 1930 all agencies combined distributed about 56,000,000 trees for forest planting. The production of two large nurseries and many small ones was not included in this figure, but this should be offset by stock used for ornamental planting. The production and distribution of trees for forest planting in the Northeast has doubled in the past five years. This expansion has gone on without any important additions to the scientific knowledge on which planting should be based and without comprehensive analysis of past experience or coördinated experiments in improved methods.

At the present rate of planting it would take at least 150 years to plant lands already idle, but five acres of farm land are being abandoned each year for each acre now being planted.

Under present practices and favorable circumstances it costs from \$10 to \$20 to plant one acre. The present expenditures for forest planting in the region are, therefore, about \$750,000 annually, but over \$3,000,000 a year would be required to plant abandoned farm lands as fast as they accumulate, and over \$100,000,000 would be needed to take care of lands already idle.

With these figures in mind it will be

seen that even the \$20,000,000 program extending over a thirteen year period now getting under way in New York State is tremendous as this is in comparison with previous efforts, will not adequately take care of the situation. Costs must be reduced and further expansion of planting activities will be needed. As important and extensive job as this should be based on the most thorough research and soundest scientific knowledge. Mistakes are costly and may not become evident for many years.

#### PRESENT PLANTING PRACTICES INDICATE PIONEERING STAGE AND NEED FOR STUDY

A consideration of present planting practices in the various states is of interest in that basic planting policy and procedure have been quite uniform and remarkably static for the past fifteen years, yet notable differences exist in regard to species used and age of nursery stock distributed.

In Table 3 are shown the percentages of various species distributed by the northeastern states in 1929. It will be seen that five species of conifers, namely northern white pine, Norway or red pine, Scotch pine, Norway spruce, and white spruce, constitute about 95 per cent of the entire production of forest planting

TABLE 2  
FOREST PLANTING PROGRESS IN THE NORTHEAST

	Area abandoned 1880-1930 <sup>1</sup> acres	Area needing planting <sup>2</sup> acres	Area planted to 1930 <sup>3</sup> acres	Estimated number trees planted in 1930
Maine .....	1,823,878	1,500,000	13,799	8,080,000
New Hampshire .....	1,779,575	986,950	18,528	1,570,000
Vermont .....	1,884,265	200,500	16,939	3,000,000
Massachusetts .....	1,402,572	547,000	57,321	3,000,000
Rhode Island .....	195,025	50,000	5,000	250,000
Connecticut .....	1,083,757	150,000	20,692	2,100,000
New York .....	7,187,693	3,839,500	207,619	38,000,000
Northeast .....	15,356,765	7,273,950	339,898	56,000,000

<sup>1</sup>Reduction of improved area on farms, United States Census.

<sup>2</sup>State foresters' estimates.

<sup>3</sup>Clarke-McNary Act, Section 4, Annual Report for 1929.

stock, and that less than 1 per cent of the total production is in hardwood species.

New Hampshire grows about 85 per cent white pine, while Connecticut uses over 79 per cent Norway pine, and Massachusetts divides 80 per cent of its production between these two species. None of these states use much spruce. In Maine, Vermont, and New York, on the other hand, from 33 to 41 per cent of the stock distributed is spruce, but in Maine 10 per cent of this is white spruce, while in Vermont and New York most of it is Norway spruce. New York, Massachusetts, and Vermont are the only states using appreciable quantities of Scotch pine.

Although there are climatic and physiographic differences between the states, especially between the northern and southern portions of the region, these differences hardly seem sufficient to justify such wide differences in practice. The present situation simply reflects the uncertain, pioneering character of reforestation activities.

Wide differences of practice indicating lack of full scientific background also exist in regard to age of planting stock being used in the various states. The figures are given in Table 4.

Maine and Vermont distribute the bulk of their planting stock as three-year-old transplants while New Hampshire and Massachusetts use four-year-old transplants almost entirely. Connecticut and

New York do not confine themselves so exclusively to transplants, and they divide these more evenly between three and four-year-old stock.

In Connecticut 34 per cent, and in New York 18 per cent of the planting is with seedling stock, chiefly two-year-olds, but the other states send out only small quantities of trees of this age. New Hampshire and Connecticut are the only states using appreciable quantities of three-year-old seedling stock. Very often shipments of three-year-old seedlings represent use of stock for which no demand developed when two years old, or for the transplanting of which space or time was lacking. New Hampshire, however, has recently made a systematic start at developing the possibilities of reducing costs by producing more satisfactory coniferous stock of this age.

#### PHASES OF PLANTING PROBLEM NEEDING STUDY

##### TECHNIQUE AND RESULTS IN THE ESTABLISHMENT OF MIXED STANDS

Mixed stands are recognized by silviculturists as the most desirable type of forest. As compared to pure stands they utilize growth capacities of the soil more effectively, produce timber of higher quality, conserve soil fertility, and present minimum risk of destruction by insects or disease. Yet reforestation in the past has been directed largely toward the establishment of pure coniferous stands.

TABLE 3

FOREST PLANTING IN THE NORTHEAST. DISTRIBUTION OF STOCK BY SPECIES—1929

	White pine per cent	Norway pine per cent	Scotch pine per cent	Norway spruce per cent	White spruce per cent	Other conifers per cent	Hardwoods per cent
Maine	40.6	18.4	—	16.8	24.2	—	—
New Hampshire	83.3	7.7	—	0.8	5.2	—	1.0
Vermont	29.0	18.0	7.6	37.8	2.3	3.5	1.8
Massachusetts	35.2	45.1	5.8	10.1	1.6	2.2	—
Connecticut	19.0	70.3	1.1	5.1 <sup>1</sup>	— <sup>1</sup>	4.3	0.2
New York	24.6	28.7	7.4	28.6	4.2	5.5	1.0

<sup>1</sup>Norway and white spruce not reported separately.



Little is known about production of hardwood seedlings of various species on a large scale, or of methods of handling hardwood stock for field planting. Most successful hardwood or mixed plantations to date have been established by field sowing.

Unsatisfactory growth of hardwoods as compared to conifers is sometimes given as argument against their use, yet on hardwood lands coniferous plantations are constantly being overtopped by hardwood growth, and when planted together in Connecticut red oak has outstripped and completely suppressed white pine. Depletion of soil fertility and modification of physical structure of the soil are generally thought to militate against successful establishment of hardwoods on old fields. Yet we have no clear understanding of the exact nature of the deficiency nor any comprehensive idea of the reaction of various species to it, and hence are in no position to meet the problem effectively.

#### IMPROVEMENT OF NURSERY PRACTICE

The cost of planting stock might be considerably reduced and output of nurseries increased to be more nearly commensurate with planting needs without greatly increased labor if satisfactory plants could be grown without transplanting. The possibilities of producing larger, sturdier seedlings by fertilization, root

pruning devices, or other cultural methods have barely been touched.

Handling of seedlings and transplants in the nursery and during transportation is a subject needing investigation. No exact information is available on how much exposure young trees will stand to what the effect of varying degrees of exposure is on survival and early development when planted. Exposure which may not kill the trees may prevent their growing rapidly enough in the first few years in the field to overtop competing vegetation. Loss of stock through heating in transport is perhaps more serious than exposure and study is needed to determine critical conditions for heating and to define measures for its prevention.

#### IMPROVEMENT OF PLANTING PRACTICE

Additional study is needed on methods of reducing cost of the planting operations. One objection to the use of large planting stock in the past has been the increased cost of the planting. A tool is now in limited use with which four-year-old transplants can be handled as cheaply as three-year-old stock with the more widely used grub-hoe. The recent experimental development of a power driven tree planting machine in New York State illustrates the possibilities along this line but its conception and design by a layman in a sheet metal works reflects no credit on the initiative of the forestry

TABLE 4  
FOREST PLANTING IN THE NORTHEAST. AGE OF STOCK DISTRIBUTED IN 1929

	Transplants				Total trans- plants per cent	Seedlings			Total seedling per cent
	2-3 per cent	3-1 per cent	2-2 per cent	2-1 per cent		3-0 per cent	2-0 per cent	1-0 per cent	
Maine .....	—	—	—	100	100	—	—	—	—
New Hampshire	0.7	—	83.1	11.3	95.1	3.1	1.8	—	4.9
Vermont .....	—	2.2	10.9	82.0	95.1	0.6	4.3	—	4.9
Massachusetts	11.9	—	74.2	12.4	98.5	—	1.5	—	1.5
Connecticut .....	—	—	36.6	29.1	65.7	3.3	31.0	—	34.3
New York	—	—	32.6	48.9	81.5	—	17.5	—	18.5

profession. Further study of tools and methods should prove a fruitful field.

The cost of planting is directly dependent upon the number of trees set per acre. Close planting has been the traditional practice because it tended to promote natural pruning and produce high quality material. Pruning is now generally recognized as an essential to quality production even in closely spaced plantations. The possibility of reducing cost with wide spacing and early pruning needs immediate study.

The possibility of reducing cost by planting a relatively small number of crop trees per acre and filling the gaps, either at the time of crop planting or several years later, with an easily established cheap species of any sort to act as nurse or trainer to the main crop merits careful investigation.

#### REFORESTATION OF POORLY DRAINED LANDS

No satisfactory method of planting poorly drained lands is known at present, and this applies to moist uplands which tend to revert to alders as well as flat swamp lands. Many of these lands once supported a good forest growth, and it should be possible to find a method of restoring the productive capacity of these lands.

#### REFORESTATION OF LANDS PARTIALLY STOCKED WITH WEED SPECIES OR BRUSH

On large areas of abandoned farm lands in the Northeast planting is not considered practical at present because of the presence of weed tree species and brush of various kinds. These lands are "idle" just as truly as open fields not being used for farming, and in fact constitute a more serious economic problem because of the difficulty of establishing a stand of desirable trees in competition with the existing vegetation. The soil on

such lands will generally be above the average of other abandoned fields of similar age, and the only reason that they now present a special problem is because of neglect in the past. There are no accurate figures on the area of this type of land, but very little of it is included in the state foresters' estimates of land needing planting as given in Table 2. Studies are needed to devise practical methods for successfully planting these weed tree and brush areas with valuable tree species.

#### GROWTH CAPACITIES OF LITTLE-USED SPECIES

About 95 per cent of all planting in the Northeast has been made with five species of conifers, namely: white pine, Norway pine, Scotch pine, Norway spruce, and white spruce. The Harvard Forest has studied the growth of Norway spruce and European larch in plantations recently, but little is known of adaptability or development of other species which have been planted in smaller quantities. Studies of such species are needed, and new exotic species should be tried to uncover latent possibilities of increasing yields. This applies to hardwoods as well as to coniferous species.

#### ADAPTABILITY OF VARIOUS SPECIES TO SITE

The choice of species to plant has been based upon a rough classification of sites as to moisture relations, character of soil, and existing vegetation. Unsatisfactory growth or failures may be traced to planting trees under site conditions to which they were not adapted, and instances of marked conditions in development under apparently similar conditions arise for which no reason can be given. The New York State College of Forestry is undertaking a study of soil conditions in relation to growth of plantations in New York State, but the subject is a broad

one, and may well be tackled from different angles by more than one agency.

Very little information is available on nutritive requirements of the various species, and the possibilities of supplying deficient elements at time of planting to enable a given species to develop satisfactorily in cases where failure might otherwise result have not been touched.

### INVESTIGATIONS UNDER WAY

In considering such a summary of needed study the question may well be raised as to what is now being done by the various agencies in the region. A census of forest investigations under way in New England and New York, compiled by the Northeastern Forest Experiment Station in the spring of 1930, lists sixty-six different projects dealing with reforestation or the growth and development of plantations, being conducted by eighteen different agencies.

Since there is a rather wide difference between agencies in the definition of a project, this statement may be misleading as to the thoroughness with which the field is being covered. Some institutions tend to define as a single project observations of similar character being made under a variety of conditions. Others break down closely related studies on different areas or under different conditions into separate projects. Furthermore, many of the projects listed are largely of a routine, demonstrational, or observational character.

The sixty-six projects may be classified as follows:

Coniferous seed studies.....	12
Coniferous nursery practice.....	14
Coniferous planting practice.....	14

Growth and development of coniferous plantations.....	6
Production and planting of hardwoods.....	6
Establishment of mixed stands.....	5
Adaptation of coniferous species to sites.....	4
Studies of little used species.....	4
Planting brush lands with conifers.....	1
Swamp planting.....	0
Total.....	66

The seed studies cover chiefly periodicity of seed years, source of seed, and germination. The nursery practice projects are largely concerned with control of weeds and damping-off, and the use of fertilizers. The planting practice projects include effect of spacing, age of stock, attempts at direct seeding, and others. Fifty-five of the sixty-six titles are concerned with coniferous species and only eleven concern the production, planting, and development of hardwoods or hardwood mixtures.

The agencies which have listed the largest number of projects include the forest schools at Syracuse, Cornell, and Harvard, and the Brown Company of Berlin, New Hampshire, which operates a large commercial tree nursery and seed extracting plant.

A consideration of the various projects listed indicates that to a large measure the work undertaken has been the result of opportunism. Projects have been set up to meet immediate difficulties or because current reforestation activities afforded a chance to accumulate desirable data. Few projects have been directed at fundamental aspects of the reforestation problem.

The Northeastern Forest Experiment Station has now entered the field in a comprehensive way and it is hoped that this activity will be the center of a coordinated program which will make the efforts of all agencies more effective.



# FELLING, GIRDLING, AND POISONING UNDESIRABLE TREES IN FOREST STANDS

By A. L. MacKINNEY<sup>1</sup> AND C. F. KORSTIAN<sup>2</sup>

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This article presents a summary of past experience in methods of eliminating undesirable trees from the forest and the results of new experiments in which poisoning with sodium arsenite was compared with girdling and felling. Very accurate time records were kept so that the cost and results of each process may be referenced to trees of different sizes and to those with soft and relatively hard woods. Under the conditions of the experiment, the authors found poisoning the cheapest and most effective method.

THE PRACTICE of silviculture often requires the removal of trees, undesirable as to species or form, from forest stands before or after harvesting the final crop. Since such trees ordinarily have little or no value and the cost of their removal brings no immediate compensating return, the forester looks for the most economical and most effective method of removing them. Three methods, felling, girdling, and poisoning, have been used and differences of opinion have arisen as to which is the most effective and ultimately the cheapest. The results of experiments in felling, girdling with a V-shaped notch, and poisoning with sodium arsenite conducted by the Appalachian Forest Experiment Station<sup>4</sup> in a mixed stand of loblolly pine and hardwoods may throw additional light on the question.

Felling was the method first used by foresters to eliminate undesirable trees. Felling of unmerchantable trees is, however, often unsatisfactory because many species sprout prolifically when cut and because falling trees may cause damage to advance growth and reproduction of desirable species. The prolific sprouting of felled hardwoods in the Harvard Forest (11) made a second cleaning neces-

sary where reproduction of more valuable species was to be favored.

Girdling for the elimination of undesirable trees from forest stands is a practice which is appropriate only where there is no market for the wood that will be thus wasted. In America it was used in 1905 when plots were established in New Hampshire (15) to study the effects of release on spruce and balsam reproduction. Churchill (9) reports its extensive use in the Adirondacks from 1925 to 1929. Brewster and Larsen (6) record the use of girdling in western national forests as do Plice and Hedden (13) in the forests of New England and southeastern Canada.

Few data have been published on mortality resulting from girdling; although most of the authors leave the reader to infer that it was complete. Likewise, information on detailed costs is rather limited. Churchill (8) reports girdling costs of \$1.25 per acre in a stand of hardwoods ranging from four to twenty-four inches in diameter<sup>3</sup> when from 55-60 trees per acre were girdled by single axe hacks. Bloomer (4) states that the cost of girdling was approximately one-half cent per tree in heavy stands of southern red gum. According to the report of a committee of the New England Section,

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<sup>3</sup>All diameters herein referred to are diameter breast high—4.5 feet above the ground.

<sup>4</sup>With the coöperation of the Forest Products Laboratory.

Society of American Foresters (2), on the improvement of stands with special reference to release cuttings, girdling in old-growth stands of large hardwoods has cost from \$1.00 to \$2.00 per acre.

The use of poisons to kill trees has been rather limited. Australian foresters (3) have used a solution containing one pound of arsenious oxide, one pound of lye, and four gallon of water to kill undesirable trees. Solutions containing the same proportions of these ingredients have been used by American foresters with varying results. Cope and Spaeth (10) found that such solutions did not contain sufficient arsenic to be effective and advocate the use of 2 pounds of arsenious oxide, 0.5 pound of sodium hydroxide, and 1 gallon of water. Phillips (12), on the other hand, found that a solution made according to the Australian formula killed Carolina poplar.<sup>5</sup> Boyd (5) reports the effective use of a solution containing one pound of arsenious oxide, two pounds of lye, and two gallons of water in killing trees on land to be cleared.

Several other poisons have been tried. Allan (1) and Butterwick (7) obtained varying results with the use of Atlas Preservative as a toxic agent. Rumbold (14), working with chestnut (*Castanea dentata*), reports that solutions containing heavy metals were more deadly than those containing alkali metals. Her experiments also showed that all trees treated with chromates were dead the year following treatment. Other investigators, using potassium nitrate, bichloride of mercury, sodium chloride, copper sulphate, zinc chloride, and ferric sulphate have obtained inconclusive results.

The methods of poison application have received little study. Most investigators who have applied poison solutions to "frills," i. e., rows of single axe cuts

around the trees, have obtained greater mortality than those injecting the poison into auger holes. Experiments by Cope and Spaeth (10) show that when a sodium arsenite solution is used the efficiency of the auger hole method decreases as diameter of the tree increases. When the poison was applied to "frills" large trees succumbed as readily as small ones.

#### METHODS AND RESULTS OF PRESENT STUDY

The objects of the present study were to obtain information on the relative cost and efficiency of felling, girdling with a V-shaped notch, and poisoning with sodium arsenite solution introduced into "frills."

The study was carried out in a stand of loblolly pine (*Pinus taeda*) and hardwoods in southeastern Virginia immediately following a selective cutting in November, 1929.<sup>6</sup> In this cutting selected loblolly pines and all merchantable hardwoods were removed. The stand following logging contained an average of 16 hardwoods per acre, ranging from 3 to 18 inches and averaging 6 inches in diameter, whose elimination was desirable in order to favor pine reproduction. The main species on the plots in order of their frequency were southern red gum (*Liquidambar styraciflua*), black gum (*Nyssa sylvatica*), white oak (*Quercus alba*), willow oak (*Q. phellos*), swamp red oak (*Q. rubra pagodaefolia*), and red maple (*Acer rubrum*).

In this study all of these undesirable hardwoods on 12.5 acres were treated. On 5 acres all such trees over 2.5 inches in diameter were felled. On 3.75 acres many of the undesirable trees from 2 inches to 6 inches in diameter were felled and all others were girdled; and on the remaining 3.75 acres most of the undesirable trees ranging from 2.6 to 6 inches in

<sup>5</sup>Probably *Populus deltoides* × *Populus eugenii*.

<sup>6</sup>The plots on which this story was made are described in the bulletin on selective logging, issued by the Virginia State Forest Service as publication number 43.

diameter were felled while all others were "frilled" and poisoned.

### COST OF TREATMENT

All treatment work was done by inexperienced negro laborers who were paid the prevailing rate of 25 cents an hour. A two-man crew equipped with an axe and crosscut saw did the felling. In girdling, one man chopped a V-shaped notch from 1.5 to 3 inches wide and from 2 to 4 inches deep around each treated tree. In the poisoning a two-man crew was found to be most satisfactory. A line of single axe cuts, a "frill," was first made around each treated tree. Following this, the second man introduced the poison solution into the cuts from a one-gallon container such as is used for servicing automobile batteries. The poison solution was made as follows: One pound of white arsenic (arsenious oxide) was made into a paste with a little water. Two pounds of lye were dissolved into

one gallon of water and the arsenic paste added while the solution was hot. This mixture was stirred until it was clear and another gallon of water was added.

The number of man-hours spent on each area was recorded and stop-watch time records were kept for each treated tree, together with a record of the species and size. All time used for resting, sharpening axes, and talking was recorded as nonproductive and later deducted from the total time spent on each area. The remaining time was called total productive time. This was subdivided into two groups, direct productive time and indirect productive time. Direct productive time was the actual time spent in the treatment of the trees while the time spent walking from tree to tree was called indirect productive time.

The direct productive time was averaged and plotted by diameter classes for each species by type of treatment. The resulting curves for both felling and girdling fell into two distinct groups

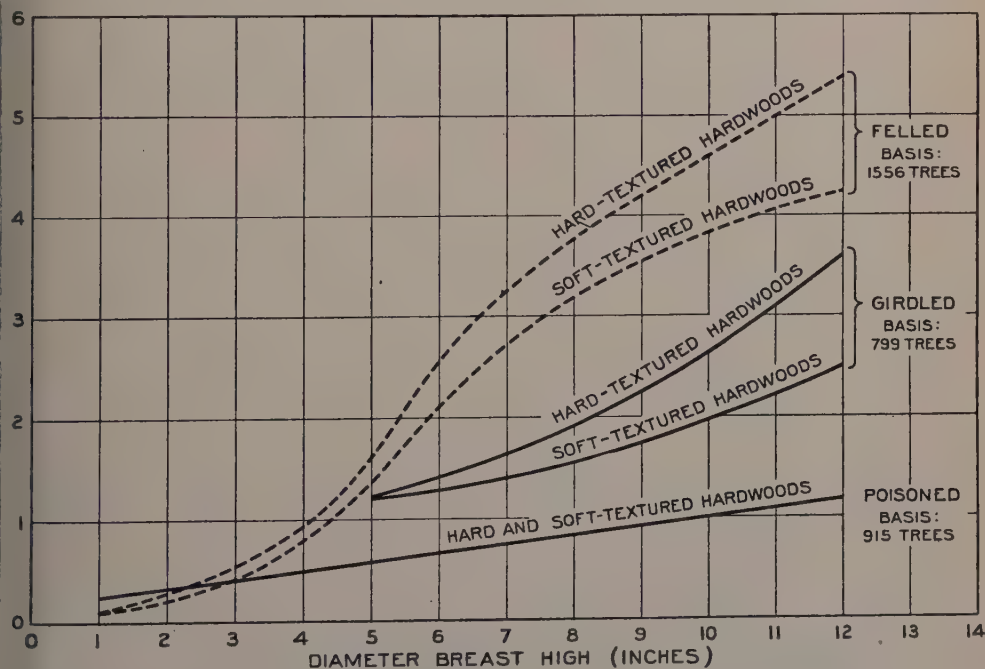


Fig. 1.—Direct productive time required to fell, girdle, and poison unmerchantable hardwood trees of different diameters.



which seemed to be limited by the texture of the wood of the species treated. The first group included mainly species whose wood is hard in texture, haw (*Crataegus* sp.), dogwood (*Cornus florida*), winged elm (*Ulmus alata*), hickory (*Hicoria* sp.), holly (*Ilex opaca*), black oak (*Quercus velutina*), post oak (*Q. stellata*), southern red oak (*Q. rubra*), swamp chestnut oak (*Q. prinus*), swamp red oak, white oak, and willow oak. Water ash (*Fraxinus caroliniana*), sweet bay (*Magnolia virginiana*), red and black gums, red maple, yellow poplar (*Liriodendron tulipifera*), sassafras (*Sassafras variifolium*), and sourwood (*Oxydendron arboreum*), trees whose wood is relatively soft in texture, were included in the second group. The texture of the wood had no appreciable effect on the time necessary to make single axe cuts and therefore did not influence the direct productive time in poisoning.

From Figure 1 it is evident that the texture of the wood had more effect on the direct productive time required for girdling than for felling. This was undoubtedly due to the greater amount of axe work in the girdling. Figure 1 also shows plainly that the direct productive time per tree in all three types of treatment varied directly with diameter. The direct productive time required for poisoning was affected less by diameter than in either girdling or felling.

Table 1 shows clearly the relative amount of direct productive time required for treating different-sized trees by the three methods. The actual time required for each of the three types of treatment varied slightly for small-sized trees, but for 12-inch trees of hard texture felling required 4.57 times and girdling 3.04 times as much time as poisoning.

The indirect productive time averaged 0.86 minutes per tree in all methods of treatment. Compared to the average direct productive time per tree for treat-

ment this seems excessively high. However, if the work had been done before the removal of the merchantable material or after the slash and tops settled to the ground the time used in walking from tree to tree would have been material less. Likewise, the direct productive time would probably have been lowered in many cases had the workers not been impeded by the slash.

In the foregoing discussion a time basis has been used in order that the values presented can be applied to stands at other localities where wage scales differ. With the wage scale of 25 cents an hour the average costs per acre for the areas treated were \$2.37 for felling, \$1.38 for girdling, and \$1.83 for poisoning. Cost of supervision is not included. The poisoning cost per acre, consisting of \$0.50 for "frilling," \$0.33 for applying the poison solution, and \$0.93 for the poison itself, was unnecessarily high. The cost of the poison solution, \$0.225 per gallon (arsenious oxide \$0.25 per pound and lye \$0.10 per pound) could have been reduced to \$0.09 per gallon or \$0.37 per acre if commercial sodium arsenite costing \$0.18 per pound had been used in making a solution of the same strength. This would have reduced the cost of poisoning to \$1.28 per acre. Also, the labor costs for poisoning might possibly have been reduced if the one-man tool, recently described by Cope and Spaeth (10) for making the incision and injecting the poison in one operation had been used.

If cost alone is considered, poisoning with sodium arsenite was found to be the most desirable of the three methods used in this study for removing undesirable trees from competition in the forest stand treated.

#### EFFECTIVENESS OF TREATMENTS

The mortality of the crown of treated trees is one of the main criteria of the effectiveness of the treatments. Crown

mortality was obtained immediately by girdling, but the relative effectiveness of girdling and poisoning must be considered.

One year following treatment a total of 36 girdled and 242 poisoned trees of various sizes and species were examined. At that time the crowns of 51 per cent of the girdled trees were dead, the crowns of 42 per cent were of poor vigor, and those of the remaining 7 per cent were healthy. The crowns of the trees alive at that time will undoubtedly die within the next few years because the cambium was completely severed in all cases.

In comparison, the crowns of 85 per cent of the poisoned trees were dead at the time of examination. All of the living trees, however, were of poor vigor and 90 per cent of the cases the tops were missing.

An analysis of the data to determine the relative resistance of various species to crown mortality by girdling and poisoning gave inconclusive results because of the many species represented and the wide spread of the data. Indications were that in both types of treatment black gum, red maple, and red gum were most

resistant in the order named. Willow and white oaks also showed some resistance to the poison used.

The point of treatment of the poisoned and girdled trees varied from 0.6 to 4.0 feet above the ground. This variation had no appreciable effect on mortality of the crowns in either type of treatment.

The influence of diameter on the death of the crowns of girdled trees was marked, the highest mortality, from 55 to 75 per cent, occurring in the small-sized trees, 3, 4, and 5 inches in diameter. Practically no deaths occurred in trees 14 inches and over in diameter. Figure 2 shows that no such regular trends were evident for poisoned trees.

When the efficiency of any method of removing undesirable trees from competition in forest stands is to be measured, its effects on the basal sprouting of the treated trees must also be considered. This is particularly true when the trees are removed to give light to reproduction already established or to open up the seed bed to light and solar heat. For this reason, data on the number of trees and stumps sprouting, the height of the tallest sprout and the number of sprouts

TABLE 1

COMPARISON OF DIRECT PRODUCTIVE TIME REQUIRED FOR POISONING, GIRDLING, AND FELLING

D.B.H.	Direct productive poisoning time. Man minutes per tree (hard & soft combined)	Ratio of direct productive time for girdling and felling to that for poisoning <sup>1</sup>			
		Girdling		Felling	
		Hard-textured hardwoods	Soft-textured hardwoods	Hard-textured hardwoods	Soft-textured hardwoods
1	0.25			0.40	0.40
2	0.34			0.85	0.59
3	0.42			1.31	0.98
4	0.50			1.88	1.60
5	0.58	2.10	2.07	2.76	2.33
6	0.67	2.12	1.90	3.82	3.13
7	0.75	2.20	1.85	4.32	3.64
8	0.83	2.29	1.86	4.55	3.83
9	0.91	2.47	1.90	4.62	3.90
10	1.00	2.64	1.95	4.60	3.84
11	1.10	2.81	2.00	4.55	3.69
12	1.18	3.04	2.10	4.57	3.59

<sup>1</sup>All time values read from Figure 1.

from each tree and stump, were also recorded in the 1930 examination.

Only 36 per cent of the poisoned trees had basal sprouts. Compared to this 58 per cent of the girdled trees and 68 per cent of the stumps sprouted. However, if only felled trees under 14 inches d. b. h. are considered, as was done for girdled and poisoned trees, 75 per cent showed sprouting. This indicates that poisoning is the most satisfactory of the three methods for preventing sprouting.

The average number of sprouts per tree, considering only trees that sprouted, was 8 from poisoned trees, 11 from girdled trees, and 13 from stumps. Apparently not only do a smaller number of poisoned trees sprout, but those which do sprout have a smaller number of sprouts per tree.

The sprouts from the poisoned trees were also shorter than those from girdled trees and stumps, the average maximum height being 3.0 feet as compared with 4.0 and 4.3 feet, respectively. The sprouts from the poisoned trees were of poorer vigor than those from girdled trees and stumps.

The available data offered inconclusive evidence on the effects of the treatment on relative sprouting ability of the several species. Following all treatments water ash, black gum, red gum, and red maple showed aggressive sprouting.

All curves in Figure 3 show a reduction of sprouting ability with increase in diameter. However, the curve for poisoned trees is much lower in the lower diameter classes than the curve for girdled or felled trees.

The influence of diameter on the number of sprouts per treated sprouting tree was evident only for felled trees. In this case the smallest stumps showed the greatest average number of sprouts per sprouting stump while the largest stump from trees 19 inches d. b. h. and over showed no sprouting at all. The average maximum height of the sprouts was not affected by diameter in any of the treatments.

The height of point of treatment appeared to have an appreciable effect on the percentage of girdled and poisoned trees which sprouted. This effect was not noticeable for felled trees. Figure 4 shows

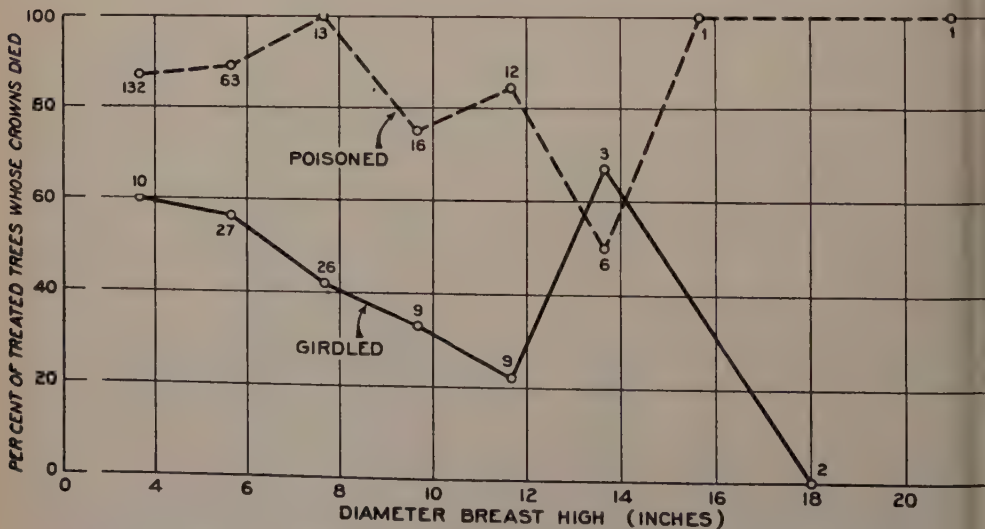


Fig. 2.—Influence of diameter on crown mortality of girdled and poisoned trees the first year following treatment.



increase in percentage of treated trees which sprouted with the increase in the height of point of treatment above the ground. The curve for felled trees shows appreciable effect of stump height on percentage of stumps sprouting. It is evident from the foregoing discussion that trees which are poisoned or girdled should be treated as close to the ground as possible to reduce sprouting.

The height of point of treatment had no effect on the number of sprouts or the average maximum height of the sprouts in sprouting trees.

### SUMMARY

Unmerchantable, undesirable hardwoods are removed from different portions of partially cut-over area by felling, girdling with a V-shaped notch, and poisoning by the introduction of sodium arsenite to "frills."

Results of time studies made in this work showed poisoning to be the least time-consuming operation. Total costs per acre were highest for felling and lowest for girdling. Poisoning would have been

least expensive if commercial sodium arsenite compound had been used.

Poisoning was more effective than girdling in killing the crowns of trees during the first year following treatment, although small trees were more sensitive to girdling than large ones. The height of the point of treatment above ground had no appreciable effect on the mortality of the crowns of girdled and poisoned trees.

Poisoned trees did not sprout so freely as girdled and felled trees. The average maximum height of sprouts and the average number of sprouts per sprouting tree were also lowest for poisoned trees and higher for girdled and felled trees, respectively.

Trees treated by all methods showed a reduction in sprouting with increase in diameter. The percentage of poisoned trees which sprouted was lower for nearly all size classes than for either girdled or felled trees.

In the poisoning and girdling, the trees which were treated close to the ground showed less sprouting than those treated at higher points. The height at which

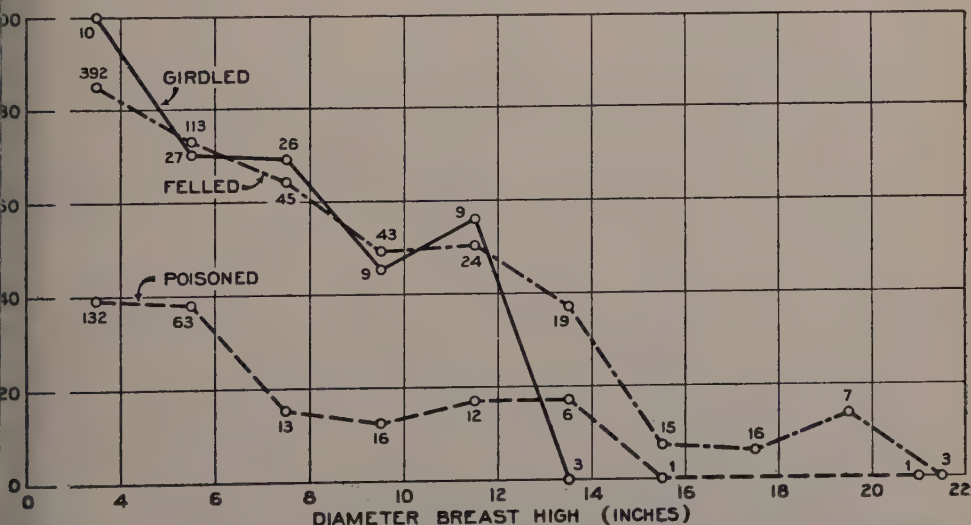


Fig. 3.—Per cent of treated trees which sprouted the first year following treatment as influenced by diameter.

felled trees were treated had no effect on sprouting ability. In no treatment, however, did the height of the point of treatment affect the number of sprouts or the average maximum height of the sprouts from sprouting treated trees.

With conditions like those under which this experiment was conducted, poisoning offers the best combination of cheapness and effectiveness for killing the crowns in the shortest time and for reducing the basal sprouting of unmerchantable, undesirable trees in forest stands. To be most effective in reducing sprouting, the poison should be applied as close to the ground as possible.

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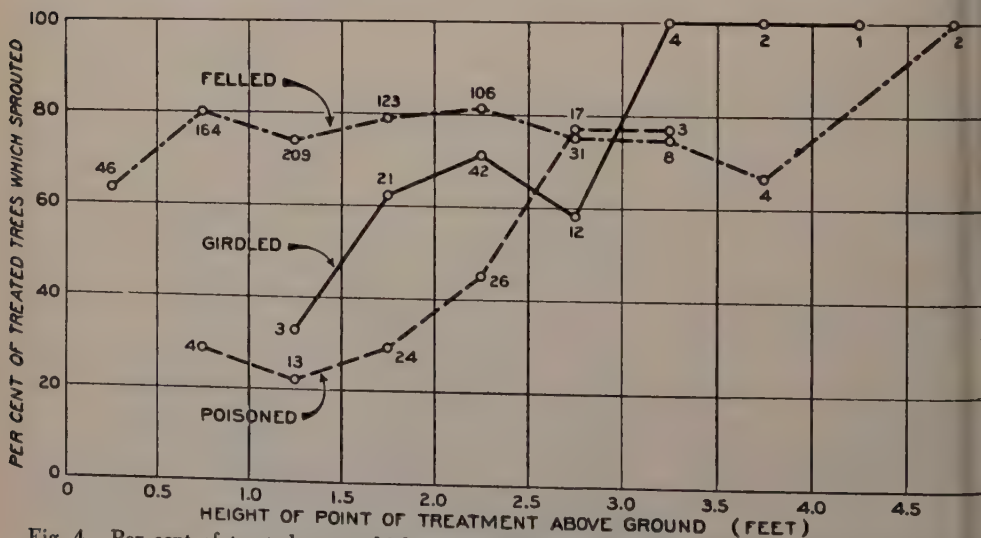


Fig. 4.—Per cent of treated trees which sprouted the first year following treatment as influenced by height of point of treatment.

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### *How do trees, forests, and brush cover affect water supply?*

Under ordinary conditions, forest soils absorb from 20 to 50 per cent of light or moderate rains. During a rain the free flow of surface water is obstructed by the spongy litter of the forest floor so that more of it sinks down into the absorptive leaf litter, down farther into the decayed leaf mold, and so on down into the mineral soil and the fissures of the rocks. There it becomes tributary to the great reservoir of underground water that feeds springs, creeks, and rivers with a steady flow of water.

The advantage of increasing the proportion of the rainfall which is absorbed into the earth and decreasing that which runs off on the surface is that the surface run-off, unless it is caught in reservoirs, ultimately goes to the ocean and is permanently lost. Also, it is difficult, often impossible, to impound or control the surface run-off when suddenly increased by heavy storms, and its power of erosion is increased out of all proportion to the increase in the volume of water.

The forest-controlled water supply, of course, does not all go into springs. Some of it is absorbed by roots and carries up to the leaves of plants and trees the dissolved mineral substances which they need for growth. A part of the water is then used in producing the increasing substance of the tree, but much of it is given off by the tree again into the atmosphere.

Some people believe we could save these water losses by burning or otherwise destroying the vegetation, especially chaparral. They forget the tremendous damage and losses which would certainly follow that destruction, due to increased erosion and silting and other disturbance of stream flow. This could well make a large part of the land useless and uninhabitable in the course of time. The service which the forest or brush renders to man in these directions is so much greater than the loss due to the water which they use that such a remedy would be disastrous.

*Forest Rangers' Catechism.*



# RECENT MECHANICAL AND OTHER INNOVATIONS IN NATIONAL FOREST FIRE CONTROL<sup>1</sup>

By ROY HEADLEY

*Assistant Chief Forester, U. S. Forest Service, Washington, D. C.*

The year 1931 gave evidence that encouraging progress in fire protection is being made on the national forests. In spite of exceptionally unfavorable fire weather and an alarming increase in incendiarism, the acreage loss was held under the five-year average. Much of the success is due to improved organization and particularly to an impressive list of new tools and power equipment for building protection roads, fire breaks and fire lines. The author discusses these and other aids and how they have helped speed up fire suppression, and calls attention to further improvements that should follow present experiments.

THE FOREST SERVICE draws much encouragement from the 1931 protection record on the national forests. Up to October 10 the area lost for the calendar year 1931 was 584,000 acres, as against an annual average of 594,000 acres for the preceding five years. Keeping within the average loss of recent years is in itself nothing to boast of. Holding to the average loss in a year like 1931 is enough of an accomplishment, however, to send a thrill of confidence and encouragement to the inwards of thousands of forest officers and friends of forest protection. We needed such a thrill, badly.

The 1931 season has been comparable only with the historic bad years 1910, 1919, 1924, 1926 and 1929. In most of the western national forests except in the Southwest, which experienced relatively favorable weather factors and came through with small losses, drought with resulting high rate of spread and bad spotting of fires was extreme; incendiarism was probably the worst ever experienced although not so bad as outside the national forests; loss of life in fire fighting (one gruesome index to severity of season) was higher than in any year except 1910. Fortunately lightning fires did not bunch badly and winds

were probably not worse than normal. In the previous season of 1930 the national forest area lost 0.11 of one per cent, the lowest percentage in the history of the Forest Service with the single exception of 1906. In 1931 up to October 10 the loss was 0.31 of one per cent. This is about one-third less than the smallest in the other five comparison years.

In 1931 to October 10, the total number of fires on the national forests was 7,934. Seventy-two per cent of these were caught, held and extinguished in areas of less than 10 acres each. Ninety-five per cent of the entire crop of lightning fires to October 10 were either suppressed at one-quarter acre or less in area or else were brought under control before ten o'clock of the day following discovery. This means speed, preparation, organization and executive competence entirely beyond the limits of what would have been possible not many years back.

Such, in outline, is the picture of present effectiveness of fire control on the national forests. The Forest Service is encouraged and confident. It has learned by bitter experience to be extremely cautious about saying or even feeling that it has mastered the job. In 1906

<sup>1</sup>Presented at the meeting of the Washington Section of the Society of American Foresters, Washington, D. C., on October 21, 1931.

ater intervals we have said or at believed that we had the fire problem in hand only to have our confidence led by some one of the new anderse elements which have plagued theory of forest protection in America ng the last 26 years. If in 1931 we suffered the bunching of lightning which sometimes occur we would btless be singing a different tune. hope is not to get a year like 1931 bad bunching of lightning fires be-our road construction and purchase control equipment has been materi-advanced.

he factors which have contributed to gratifying progress signalized by the 0 and 1931 figures are many. Effect-forest protection is above every- g else a balanced and integrated com-te of scores of elements. Utilization mechanical aids to forest protection made a most important contribution. ent years have witnessed one of those es of creative development which oc-from time to time in all fields of an activity.

ehind the important and sometimes ctacular development of mechanical s to forest protection, lies the astound-general development of the last ten fifteen years in the general field of hinery. In large part, forest protec-has merely taken over and applied its special uses the marvelous fruits science and mechanical engineering ch have ripened during recent years, n though forest protection men have e some important inventing of their n in response to the urge to master fire problem.

One of the more spectacular develop-nts—possibly the most important one, ludes the group of machines which used for protection road building. I have been able to retrace the growth the idea correctly, the genesis of our sent techniques of building low cost ds with special machinery goes back

to the creative thinking of Wilbur Huestis of California. There were earlier ventures along this line but they got side-tracked. Our present developments began with the creative search for some mechanical substitute for the slow and costly old time ways of constructing roads, trails and fire breaks through the dense jungles of California chaparral. The germ idea lay dormant for some years, then sprouted and grew lustily in response to a fresh urge to find some reasonably effective way of opening up the brush fields. From this beginning the growth of the new ways of building roads and fire breaks has been steady and rapid. Heavy crawler tractors, fully armored for rough use, had already been developed for logging use. Five-ton graders were available, although not perfected as fully as the logging tractor. The weakness of this outfit for road building was that it could not operate on steep side hills until after a cut or shelf had first been opened up by hand or with horse power. To meet this need forest officers with the coöperation of manufacturers developed what is called a trail builder, which is a crawler tractor with a power controlled blade attach to the front of the tractor. This tool in its rudimentary form is used by contractors in filling ditches and pushing dirt into fills. The trail builder has proved invaluable in making cheap protection roads in rough country.

The most recent development has been a road ripper which can be dumped like a hay rake when it becomes clogged with rocks, stumps and other debris which collect as this tool is used to scarify material too refractory to be handled effectively by a grader blade. This is a creation of forest officers and coöperating manufacturers. It is an unexpected and very great aid. Most of us had considered such a thing mechanically impossible. The development of more efficient gas shovels by manufacturers has also

been a boon to construction of protection roads under certain conditions.

These power tools do more than decrease the cost of necessary excavation in protection road building; they have greatly simplified and cheapened the clearing of brush, logs and timber which must be removed in road building. Perhaps the most spectacular of their work is in clearing heavy brush. Foresters who have been compelled to work in dense chaparral, such as occurs in California, have acquired thereby pronounced attitudes of respect—or shall I say detestation? of such growth. You can not walk through it satisfactorily. Sometimes you have to walk on top of the mass—if it can be called walking. Some times you have to crawl on your hands and knees. Everything it is necessary to do in this growth is a source of endless exasperation. The cutting of roads, trails or fire-breaks through it used to be slow and costly. Moreover after cutting off the chaparral in the usual way, the sprout growth would, in a few years, pretty well obliterate all you had done. Grubbing by hand to prevent sprouting involved an almost prohibitive cost.

Imagine then the intense joy with which a man who has struggled in such growth for years, mounts a 60-horse-power armored tractor or the 11,000 pound grader behind the tractor, and watches this apparently irresistible power crash through and throw aside what has so stoutly resisted his puny efforts employed in the old time way. I know of no experience which gives a livelier sense of man's mastery over nature. Regional Forester S. B. Show, through his earlier years, was forced by circumstances to fight California's chaparral on foot and by hand more than most men. When he now has a chance to ride a tractor or grader working in dense chaparral, he immediately becomes lost to all other interests. The triumph of the machine over his ancient enemy the dwarf forest gives

him such joy that he practically has been dragged from the machinery back to his more prosaic duties. His joy is diminished by the fact that this development took place under his leadership as Regional Forester.

Advances in mechanical engineering have also given us trucks, passenger cars, and passenger buses which are far ahead of the equipment of this land we used to have that speed and reliability in transportation of men, supplies and equipment have been revolutionized. Coupled with this mechanical development there is the effect of years of extension of the road systems needed for forest protection. The two factors together have so changed methods and effectiveness of forest protection that it is sometimes hard to realize just how rapid and how complete the transformation has been.

One important group of machinery which is just coming into its own includes the various mechanical devices for constructing fire lines with power tools. Before discussing them it is appropriate to review what might be called the rhythm of forest fires.

Disregarding the exceptions, a forest fire goes through certain fairly definite stages. After ignition by lightning or human agencies, there is a period of harmless incipency lasting anywhere from a few minutes to a few weeks, the case of hang-over lightning fires. During this stage, nature says in effect to the forester—"here is your chance to get this fire easy. Have you provided facilities for speedy detection, speedy communication, fast get-away, fast transportation and fast and competent cutting and mop-up? If you have, this fire will give you no trouble." If you have not, nature suggests that she will put this fire into the newspaper headlines.

The vast majority of forest fires that are ignited *are* caught and extinguished in this stage of harmless incipency.



are not. A few grow extremely e, make the front page of the news-ers, and cause the great bulk of the damage. If not caught in its harm-stage the typical fire makes its first On the more destructive fires, little be done during the first run except make and clean-burn a fireline on rear or quieter portions of the peri-er.

ut the first run does not last forever. r anywhere from one to twenty-four rs the fury of the first run is spent nature again challenges man saying you fumbled your first opportunity— e is your second one. Have you pro-d the organization, the equipment, executive competence necessary for construction job of surrounding this with held line before I arrange for second run any where from one to en days from now?"

n an increasing number of instances, tection executives are successful in ing this second challenge. On the eman Lake fire, starting outside but eping into the Kaniksu National For-last summer, nature (touched off by areless man with a match) neglected give the usual first opportunity for the executives. The fire went into a vis-us first run, I believe, before the or-ization had a chance to reach it. In e afternoon the fire spread to a size ich necessitated the construction of miles of fire line. In this run some our most cherished timber-producing ntry was swept over, ranches and nes were destroyed and irreparable nage done.

But after this first terrible run the fire ve the fire fighting organization its nce.

Local newspaper reports say that 1,400 n were mobilized, organized and put work on the line within the first 24 urs after the fire started. Be that as it y, 90 miles of fire line were con-ucted in four days, including the lines

which had to be constructed around the innumerable separate spot fires started beyond the perimeter at which the fire paused after its first run.

Construction of 90 miles of line in rough timbered country in four days, with all the clearing and trenching and shifting of crews and hunting for spot fires that this involves, is a construction job of such size as to call for any power tools which will add speed to the under-taking. There are a number of such tools.

In level country, as in the Lake States, or on terrain where the slopes do not exceed 40 per cent, a crawler tractor pulling or pushing a digging tool best meets the demand for speed in construc-tion of control lines. The tractor with the trail-builder or bulldozer blade in front has certain special advantages. Tractors used in logging camps, when requisitioned for fire fighting service, drag boulders, V-shaped drags, or other tools which will make the needed trail or trench to mineral soil. One special plow now in use was developed by W. B. Osborne of Region 6. What may prove to be a very effective digging tool to use behind a tractor is a rolling disc affair developed jointly by Supervisor Hadley of the Ocala National Forest and the Hes-tor Plow Company.

In rougher country, where slopes of from 40 per cent to 65 or 70 per cent are encountered, the horse and plow, with the aid of a man who knows his business, constitute the modern high speed tool for fire line construction. Unfortunately much of the area in our western national forests was left by "Paul Bunyan" in such an unfinished condition that slopes of over 40 per cent are pretty regularly encountered on fire fighting jobs. For country of this degree of roughness, up to the present time, no power tool has been found which surpasses the horse and plow, or even competes with it.

Not just any horse, and any plow. To meet the specifications of the fire line

construction job in rough country the horse must be of heavy weight, of a certain kind of temperament, well trained and hardened to such work. The plow must be of the reversible or hillside type, light enough to be transported easily on pack animals and light enough to be handled by the plowman without killing him. The plow must also be strong enough to stand the strain when a 1,600-pound Percheron horse, pulling with every ounce of strength in his magnificent body, drives the point head on into a solid rock or an unbreakable root. Fortunately such a plow was already available. All we needed was the wit to see the possibilities for its adaptation to the demands of our work.

This speed tool, or rather its use, is the outcome of some 15 years search for a power tool which would improve on the speed and efficiency of the ancient ways of making fire lines. In 1916 and 1917 we had a qualified man experimenting and building different designs of a plow which would serve our purpose. Nothing came of it. Then in about 1923 District Ranger L. G. Nichols of the Bonita district of the old Missoula National Forest was discovered digging trail with a heavy horse and the Oliver reversible plow. Regional office men saw the possibilities and put the equipment into wider use in trail building. In 1925 a group of men assembled every known tool for horse power digging in timber land, with the idea of finding something which could be used in California for fire line construction. The Oliver plow and single horse obviously had every other combination outclassed. We are now equipped with a number of such outfits as well as the trucks needed for their rapid transportation to fires which have gotten away from the one-or two-man stage.

I hesitate to say what the horse and plow will do for speed and economy in fire fighting, lest I be not believed. Yet,

it is my firm conviction that what we have gained by use of this tool to date is quite negligible compared with what we shall be getting regularly from it in five years hence when men will be more plow conscious and when, incidentally, we hope we shall have been able to produce the horses and plows we need. Nevertheless, the horse and plow has serious limitations. Where any considerable percentage of fire line has to be made on slides of over 65 or 70 per cent, the use of the rig probably does not pay. Worse than that, such an outfit fails to appeal to the average man. If we could use horses powered with a gas engine or plows provided with wings or a radio tube, the time required to get the method fully utilized would be cut down by several years.

One of the important aspects of the use of power tools of any description in fire line construction is the effect it has on the organization and management of a fire fighting job and on economy. Those who have tried to organize and manage a 20-man crew on a fire know how far short the output per man falls of what would be obtained with only a half dozen men to manage. Probably no living human being possessed of an instinct for effectiveness in utilizing human energy can handle a hastily mobilized crew of several hundred men on a fire in a way which will be satisfactory to himself. It simply does the best he can and knows that waste and delay are an inseparable part of the undertaking. With the digging job taken over by tractor or horse and plow outfits handled by trained men the executive job of fighting a large fire is enormously simplified.

A man whose executive capacity would permit him to handle very successfully 50 men and a couple of tractor or horse and plow outfits might be hopelessly overwhelmed by the executive job of managing several hundred men working in the ancient ways. Seasoned and skilled

atives are always woefully scarce as number of important fire fighting multiplies during a bad season. Anything which can be done by way of lightening the executive burden makes possible to utilize men of less executive experience or skill.

The next group of machines deserving mention includes the many types of equipment using water in fire fighting. Portable gasoline pumps are no longer new. While they are being improved in portability and efficiency every year by manufacturers they long ago passed the experimental stage. Developments most needed are in the field of equipment management in the use of such equipment. Tank trucks for hauling water and motor power to fires have not advanced so far as pumps, although the equipment now being used is pretty satisfactory when we can manage to buy it. Hand pumps and water containers can be carried on men's backs still need perfecting but are being widely used and have been very important mechanical aids particularly in mopping up.

Airplanes have been used for twelve years in national forest protection. Their importance is generally overrated, but they have a part to play. The development of six- and twelve-passenger planes has opened up opportunities for worthwhile transportation for men and supplies under certain conditions. Landing fields are being cleared in some of the western national forests particularly, where for one reason or another, it is not desirable to build roads. It is reported that one hundred thousand pounds of freight was delivered to a landing field in the Flathead National Forest last summer at less cost than if transportation had been by the only other available means—a combination of railroad, trucks and slow and costly pack train.

Our hope that airplanes would play an important part in discovery of smoldering lightning fires before they throw

enough smoke to be visible to lookout men, has not materialized. The tendency at this time is to search out such fires by a prearranged plan of ground patrol or "moving lookout" service along ridges after lightning storms. However, when the smoke from forest fires is too dense for lookout men to detect fresh fires but not too dense for the airplane to fly in, detection from the air has occasionally rendered important service in speeding up discovery.

It will be interesting to watch what develops from the autogyro. Since this machine requires much less investment in clearing of individual landing fields than the ordinary type of plane, some revolutionary changes may eventually take place in the organization of presuppression forces and the management of suppression jobs. The difficulty, so far, is the relatively limited carrying capacity of the autogyro planes.

Forest Service experience with radio has been a checkered affair. In 1919 we invested more money than I would like to admit in radio equipment which we were assured would do wonderful things for us. This equipment was a complete failure. We then experimented along various lines without success. Finally a start was made on an entirely new line by D. L. Beatty, then a member of the regional office at Missoula, Montana. The technical limitations on the use of radio under the conditions peculiar to forest protection have been worked out conclusively and we know that these obstacles interfere to a certain extent but not too seriously. Developments of the past summer by the Region 6 organization included a feather-weight set which receives voice but transmits code only. Its weight is ten pounds or less with batteries and accessories. The first man sent to a fire can take this set and use it to report back as to whether or not more help is needed. Another set weighing from 25 to 40 pounds including batteries, sends as



well as receives voice. Use of code will therefore be unnecessary except in sending messages from the ten-pound set. Subject to financial limitations it is planned to place about 200 of these sets in service next year, in four or more national forest regions.

Radio can not be expected to replace telephone communication. It supplements telephone communication. There is no reason to use a less efficient tool merely because it is new. Radio has a place in providing communication where crews or individuals are moving around or where for any other reason telephone communication can not be utilized. Occasionally radio will be used in lieu of a telephone line. I have one such instance in mind in Alaska.

Machinery for rapidly blasting down snags in fire fighting must be mentioned. This mechanical device grew up in Oregon and Washington where huge snags in the old burns constitute such an obstacle to the control of any fire which starts in or reaches these old snag areas. The machine consists of a portable electric generator driven by a portable gasoline engine, the current being transmitted by cable to an ordinary electric motor used in hand drilling as on ship timbers. The effect is that whereas formerly the loading of explosives in holes bored in a snag took a relatively unimportant amount of time and the hand boring of holes took an excessive amount of time, the situation is now reversed, roughly speaking. Holes are bored in snags so quickly that more time is required to load and fire the holes than to bore them. This machinery is now available and in use in the North Pacific region.

I might go on at length enumerating other mechanical aids to forest protection which have been developed or applied in recent years. For example, there is the new centrifugal spark arrester for railroad locomotives. Most of you know that the best that can be said of the

numerous older types of spark arrester is that they stop most of the sparks. The new arrester gives every evidence, so far as I know, of being a permanent and complete solution of the locomotive sparking problem. It is interesting to trace the history of this particular mechanical device.

The original invention—the invention of creative thinking, was done years ago by a man who was then a locomotive engineer. The idea then lay dormant for many years. When the Forest Service made a study of spark arresters a number of years ago this particular device did not come to its attention. In 1929 the Northern Pacific Railroad had started using particularly bad sparking coal. A regional forester, whose organization was being harrassed by railroad fires, saw the duty and did it. The railroad company responded promptly and aggressively. The original inventor of the device was then in a supervisory position with the railroad. His invention was revived, perfected and has now been installed on engines of this company operating through forested regions. Its use is spreading to other railroads. Inquiries are even being received from abroad.

A fantastic machine has been conceived by a forest officer and is being constructed experimentally by a machinery company, for sawing a way through jungles of windfalls where they have to be cleared away before the trail can be plowed or hand tools. I use the word "fantastic" machine because I am personally skeptical about the practicability of the device. I consider it a pipe dream. Its chief proponent is Evan Kelley and those who know him would not accuse him of being addicted to pipe dreams. So we shall see what we shall see. Sometimes it takes 130 or more men to do the clearing ahead of a single horse and plow outfit. The invention and development of a machine to speed up the clearing

of fire line construction would be a development of note.

Wish there were room to tell in detail about the instruments for the location of fires detected by lookout men—particularly about a camera on which W. B. Osborne has spent the entire season of 1931. The vital principle of this camera is a scale permanently etched on the lens which will give an accurate blocking out of territory on pictures taken with it. At least that is the way I would describe it. Such pictures will undoubtedly facilitate location and rapid fire finding.

Some of the numerous developments of new tools for use in fire fighting have made important contributions to speed. There are also the various instruments which have been invented or adapted for use in recording elements of fire weather, particularly an instrument for ascertaining moisture content of duff developed by Gisborne and the Forest Products Laboratory. Then there is the development of lighting equipment for night work in fire fighting. Increasing pressure for speed in controlling and mopping up fires has made it imperative that work go on at night just as in daytime, but lighting equipment for night work has been a troublesome problem. I would not say that it is solved yet by any means. But better equipment is being made available every year. On my part, I think an electric battery lighting outfit developed by a research man of the National Carbon Company which seems to register a distinct advance in this field. The various machines which have been introduced into forest protection have brought about a drastic reduction in the cost of constructing and maintaining permanent fire breaks, the cost of construction and maintenance of which for many years was so great in comparison with that they accomplished that their use is not justified except under special circumstances. That condition is rapidly

being changed. The low cost, low standard roads we are building for forest protection function as fire breaks as well as for relatively rapid transportation.

It should be clearly understood that no one of the mechanical developments which I have mentioned is a cure-all or panacea. The contribution made by some of them is so small as to be practically unmeasurable. In the aggregate, however, they represent a force of sufficient consequence so that it is not inappropriate to use the word revolutionize in speaking of the end effect. One task of forest protection men is to avoid losing their balance and sense of proportion in considering each individual piece of machinery. Some machines are very intriguing and it is easy to yield to over-enthusiasm and lose some of the values that would come from proportion and balance in recognizing the place each machine has in forest protection. To put it another way, the first responsibility of a protection executive is to keep the attention devoted to each machine or line of development as nearly as possible in correct relationship to the real contribution that machine or line of development makes or promises to make to forest protection.

To balance what has been said about mechanical aspects of forest protection reference must be made to some of the innovations or developments which have occurred outside that field. For example, there is personnel management and training. That is my chief hobby. If it were possible to weigh out accurately the results attributable to specific causes, we would probably find that no other factor deserves equal credit for the headway made in forest protection. Doubtless this is true in any activity which involves the element of personnel. Unfortunately perhaps, little publicity is given such developments, which incidentally, are often disappointingly slow; but if one goes among the men who are making protection history one is likely to find devoted

to the personnel and training phases of the job a major portion of the attention they are able to give to protection. Again job analysis and work plans based thereon have a very real part to play in forest protection.

One could well devote some time to developments in law enforcement as a means toward fire prevention. The most significant recent thing which has come to my attention is a promising looking scheme of organization of state-wide fire law enforcement in California. California, outside the national forests, suffered severely from incendiary fires during the past season and the challenge which this represents seems to have been accepted and acted upon in a most aggressive way by the State Forester's office.

Although fire prevention by means of educational efforts is of vital importance, I am not able to report any noteworthy developments other than more intensive efforts along lines already familiar.

I wish it were appropriate to go into the rather involved question of the relation of financial management to effectiveness of forest protection. This is another one of my hobbies. The complexity and importance of the financial management problem of the Forest Supervisor or Regional Forester are often too little

appreciated. A sample problem is one involving correlation between expenditures for protection and the variation in fire danger. Although considerable experience and skill is required it is actually possible to get flexibility and control in expenditures for forest protection which will possess a high degree of relation with the often extreme and usually more or less unpredictable fluctuations in forest fire danger.

In closing I would strongly urge necessity for cultivating habits of balance and discrimination in thinking about innumerable elements entering into effective protection. These elements are numerous and so diverse that it is easy to become absorbed in one or a few of them to the detriment of the symmetrical whole of forest protection. Each of us has his special interest or confidence in some element of protection—which is fine; but we need also a critical, appraising, comparing attitude toward such special interests if we are to avoid ultimate disappointment in the progress of forest protection. If general public opinion is led by foresters to understand what a many-sided thing forest protection is, more intelligent and therefore more effective support is to be expected.



# OPPORTUNITIES IN PARK WORK

By J. D. COFFMAN

*Fire Control Expert, National Park Service*

Recreational activities of the national parks are assuming such proportions as to create a need for technical and administrative specialists for their proper development and handling. The author discusses this need and suggests the training qualifications desirable for future park officer applicants. Mr. Coffman has had many years' experience as an administrator, first in the national forests and then in the national parks. His comments and suggestions have the approval of the Director of the National Park Service. Following Mr. Coffman's article is a brief comment by Mr. Barrett of the Forest Service on similar opportunities in the national forests.

TO THE YOUNG MAN who is today contemplating the choice of forestry or allied work as a career, who is considering specialization in forestry, the writer would suggest serious consideration of the field for service offered in park work. For the man with natural inclinations in that direction, who likes contact with the public in recreational or educational lines and has a knack of leadership in such activities, it would be difficult to find a more attractive field.

Although state and metropolitan parks offer opportunities for a goodly number of trained men, the writer's personal knowledge of park work has to do primarily with national parks. Therefore, the following suggestions are made with special reference to work in the National Park Service, in which branch of the general service landscaping, educational activities, and general recreational administration are important and distinctive features of the work.

The following statistics will give some idea as to the size of the organization and consequent opportunities within the National Park Service:

There are at present 22 national parks and 34 national monuments, embracing an area of 10,407,896 acres, administered by the National Park Service. Three additional parks have been authorized by Congress for acceptance when the pri-

vate lands within their boundaries have been acquired and presented to the government.

All permanent appointments in the National Park Service come under the classified Civil Service and include the following administrative and technical positions:

- 1 Director
- 1 Associate Director
- 4 Assistant Directors
- 24 Superintendents
- 9 Assistant Superintendents
- 24 in Engineering Division
- 18 in Landscape Division
- 27 in Branch of Research and Education
- 154 in Protection (Ranger) Organizations

In the National Park Service, as well as in every line of work that has to do with public contact, personal qualifications of the highest character are essential, irrespective of the employee's scientific training. Personality, appearance and judgment must be such as to enable him to deal with the public in a manner that will create a favorable impression for the Service; energy, physical condition and stamina must be such as to enable him to endure long periods of hard work; and by no means last is the important quality of initiative. Unless a man is endowed with these essential qualifications, collegiate training will not fit him

to be either a good park ranger or park naturalist or for advancement to the position of park superintendent.

Employment in national parks for men trained in forestry or natural sciences would ordinarily fall within either (1) the protection (ranger) organization or (2) the educational division. It is to these two lines of work that the suggestions in this article apply. (While an appreciation of forestry and geology is likewise essential for the landscape architect and much of the suggested preparation would be beneficial for those entering the landscape division of the Park Service, specialization in landscape design and architecture would be added requirements for that activity.)

In the protection organization the beginner now enters as a park ranger, with opportunities for successive advancements to district ranger, assistant chief ranger, chief ranger and superintendent.

In the educational division, the beginner would enter as junior, assistant or associate park naturalist, depending upon qualifications and experience and the classification of the position, with opportunity for promotion, after further experience and training and demonstration of ability, to the position of park naturalist. There should be no obstacle to his advancement to positions in the administrative service if his talents and inclinations lie in that direction.

It is quite probable that if a sufficient number of scientifically-trained college graduates desired to enter the Park Service ranger organization, arrangements could be effected with the U. S. Civil Service Commission for the establishment of a professional grade of Recreational Assistant (or some other appropriate title) comparable to the grade of Junior Forester in the Forest Service.

There are in the National Park Service at the present time 25 employees who have either graduated from forestry

schools or have had two or more years of collegiate forestry training, occupying the following positions in the permanent force:

- 1 superintendent
- 1 chief forester and senior park naturalist
- 1 fire control expert
- 1 field naturalist
- 2 associate park naturalists
- 1 assistant park naturalist
- 1 assistant superintendent
- 3 chief rangers
- 1 assistant chief ranger
- 1 forest assistant
- 12 park rangers.

A number of forestry students secure summer employment in the national parks as temporary rangers, lookout observers, fire guards or smokechasers, and on train crews, timber-type survey parties, on similar work.

The main difference between a standardized course in forestry and one in recreational administration furnishing the requisite training for park work would, in the judgment of the writer, be the substitution of studies in recreation, landscape appreciation and in wild life in place of lumbering, wood technology and utilization and similar studies essential in preparation for commercial forestry work.

For either the prospective park ranger or park naturalist, the following subjects are recommended for inclusion in their undergraduate courses:

Botany	Fire prevention and control
Chemistry	Geology
Physics	Dendrology
Forest economics	Forest pathology
Mapping (topographic and type mapping)	Wild life management
Landscape appreciation	Recreation (including public relations, administration, policies and recreational uses)
Forest improvements	
Vertebrate zoölogy	
Silviculture	
Ecology	
Forest entomology	

Thorough training in English composition and in public speaking is highly de-

able in any case, and is essential for those planning to enter the educational division. Ornithology and preparation of specimens of birds and mammals would also be valuable elective courses.

A working knowledge of first-aid practice is essential for all Park Service field men. Instruction in First Aid is now given to all students in many colleges. If it is not a required course, it should by all means be included in the curriculum of students preparing for park work.

For those who plan to enter the educational division and aspire to the position of park naturalist, studies and experience in natural history work beyond the bachelor degree are recommended. For all such, courses in psychology and educational methods and in wild life ecology are suggested; and, in addition thereto, research in one or more of the following subjects, according to the special aptitudes of the individual:

Botany  
Zoology  
Geology  
Glaciation  
Volcanology  
Recreation  
Archaeology

Paleontology  
Anthropology  
Ethnology  
Museum work (including preparation of material)

For park naturalists mature men with experience are desired, who have the ability to meet the public well; who can organize educational and museum work; and who know how to get acquainted with the fauna and flora and bring the public to a personal acquaintance with the life and geology or the historical values of the park. This latter phase applies particularly to the Colonial Monuments, where historical values are the features of greatest interest and importance and therefore the educational work would be more along historical lines. For such national parks and monuments, specialization in local history is essential.

The policy of the National Park Service has been and continues to be decentralization and the avoidance, so far as possible, of cut and dried policies from a central office. For both the ranger organization and the educational division, therefore, men are wanted who have initiative and who see the great opportunity afforded in the national parks to serve the public and who can actually organize and carry out the particular program that best fits the park in question



# OPPORTUNITIES FOR FORESTERS WITH RECREATIONAL TRAINING IN NATIONAL FOREST WORK

By L. A. BARRETT

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Many of the points brought out by Mr. Coffman in *Opportunities in Park Work* are worthy of consideration also by the young man who is contemplating a career in the Forest Service. If the forest school graduate of twenty years ago was well grounded in forestry, he was believed well fitted for the all-around work of a forest officer. Then it was found that some knowledge of grazing was essential if he was to be able to correlate the growing of trees and the grazing of live stock. And now it is evident that the all-around forest ranger or forest supervisor of the future must have some training along the line of recreational engineering if he is to properly correlate this most rapidly growing forest use with the primary pur-

poses for which the national forests were created.

The time has come when there is demand for men with a technical forestry training and who have specialized in recreational engineering. There are many important and interesting problems to be solved that require men with this training and point of view. Men with these peculiar qualifications are scarce.

In the future many important national forests will require the services of recreation specialists just as they have timber sale specialists and grazing specialists now. And the up to date district ranger of the future must know something of landscape design, forest improvement, wild life management, and recreation, if he is to properly handle his job.

# SOME IMPRESSIONS OF EUROPEAN FORESTRY

By EDWARD C. M. RICHARDS

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Ordinarily American foresters returning from visits to European forests report their impressions of the silvicultural and utilization standards. The present author reports his impressions of the attitudes toward the forest of the European forester and general public and contrasts them to those obtaining in America. He discusses the recognition of the long-time complete use of the land as the fundamental consideration; the long-time nature and value of forests; respect for the forestry profession; respect for property rights; respect for full use, as contrasted to waste, and for orderliness and carefulness; freedom from fire; the low financial return of forests; the guarding of the forest capital or growing stock; and the heavy yield of products. He concludes that forestry is a public rather than a private enterprise.

IN PRESENTING this paper, I wish to make two preliminary statements by way of introduction.

First: I want to place before American foresters some of the impressions of European forestry which struck me as most interesting, without making an attempt to present a treatise on European forestry. No pretense is made of doing more.

Second: this paper is not to be taken as conclusive or exhaustive; it contains merely some impressions gained when in the pursuit of other information. Also, it is limited to Austria, parts of Germany, Hungary, Rumania, Czechoslovakia, parts of Switzerland, and to the Highlands of Scotland. The forestry impressions are somewhat mixed with some others which may be of value to us here in America.

The first thing that struck me in dealing with the foresters of Europe, who are the men who put forestry into practice there, of course, was their psychology as far as the forest is concerned. I found them to be thinking in terms of soil and of the possibilities of managing and increasing the

out-put of wood products of a given piece of soil. They were interested in just how to do this by changing soil conditions by drainage, by adding lime, by the use of wild boar, etc. Their fundamental conception of being the managers of a piece of soil struck me as being the outstanding difference between them and American foresters. They are not at all merely protectors of forests, with their minds centered upon fire patrol, telephone lines, look-out towers and fire trucks, nor are they merely planters of forests, thinking only in terms of nurseries, seed beds, or planting stock, nor are they merely men trying to figure out the most profitable way to hold a given stand of merchantable timber until it can be cut to best financial advantage. They are not thinking primarily of supplying logs to a certain given saw-mill, nor of getting together sufficient standing timber to keep a given wood-using plant going for another ten or twenty years. Their job, as they see it, is to take a given piece of soil and handle it in such a manner as to produce the best crop of forest in the best and most profitable

way, always considering the long look ahead as more important than the immediate advantage. Forestry, with them, is a permanent part of the national life and as in raising prize cattle or blooded horses, quality and the constant improvement of their stock (which is here the forest property) is basic while immediate profits in cash are distinctly secondary.

An excellent illustration of this came to me during a conversation with one of the chief foresters of Saxony. I asked him whether the present cut in Saxony exceeded the growth. His reply is interesting, not only to foresters, but as illustrating the difference between the general psychology of Germany and of the United States. He told me that before the World War the cut and the growth of Saxon state forests was approximately the same. During the conflict, however, the urgent need of forest products forced them to over-cut, so that their forest growing stock was much reduced. Now, however, they are deliberately under-cutting in order to build up the depleted forest capital. This was a most astonishing thing to an American, for the reason that, knowing the situation in Germany as I do, and realizing the urgent need for immediate cash all along the line, to find that the German foresters had held themselves to the sound business policy of building up their productive capital for the future, rather than to cash in by over-cutting their present stand, was remarkable. The natural reaction of an American placed in such a situation would be that, of course, as we must have money now, we will cut into our reduced forest

growing stock even further and let posterity take care of itself. Here is food for thought for us in America, especially in forestry.

Another interesting detail of the psychology of European foresters is the accepted fact that over there forestry is looked upon and accepted by everybody as a high calling, an honored profession in which a man can well spend his life with self-respect and permanent satisfaction. It is not considered just a temporary job through which a young man can see the country, get some out-door life, and then drop out of the picture in order to get into the bond business or the selling of automobiles as the proper sphere of the aggressive and ambitious young fellow. German foresters grow old in their profession and although they do not make big money at it, nor quickly reach the top, they quite evidently hold positions in their local communities which are decidedly important, and this reflects in their personal dignity and in the prestige which is accorded them and which we all well may envy. To be a forester in Europe is to be a man of value in the life of the country, and everybody, high and low, is accustomed to look upon him as such.

Another interesting observation on my tour of some six thousand miles by automobile was that in all that distance I passed only one area of forest that had been freshly burned and this area was about one hundred feet across and alongside of a highroad. All the rest of my journey passed through or alongside of forests of all ages and of many types. It would have been easy to have set fire to



many of them, as the forests come right up to the road, with little or nothing in the way of an adequate fire line. The question, therefore, that naturally comes to a visiting American is: Why are there so few fires over there? Of course there are many reasons, including damp weather and a fairly regular rainfall, with an absence of prolonged droughts, but this does not tell the whole story by any means. The impression I got was that the people of Europe had a mental attitude different from ours towards forest fires. Somehow it has been impressed upon them over there that forests are valuable and important, and that they belong to somebody, and that such being the case they are not to be destroyed, abused or burned up. With this psychology in the mind of the general public, the forester has a much better time of it there than in America, where too many people do not consider forests to be of any particular value and are inclined to be indifferent to their welfare so long as they do not belong to them personally.

In addition to this attitude, there is apparently a general, widespread habit throughout Europe of neatness and orderliness. One never sees piles of old papers and rubbish dumped alongside of the road. Sometimes one wonders what happens to all the stuff that evidently is thrown away. In any case it is not left lying around in sight and this results in roadsides that are neat, clean and free from accumulations of inflammable debris material even many miles away from any town or city. No piles of brush or dried leaves are left lying around, and

all of this is reflected in fewer forest fires.

Another thing in the mental make-up of the European is his concept of property in general and forest property in particular. A regulation dealing with the care of a forest or of land, is expected to be obeyed by everyone. Their laws and rules are made to be respected. Contrast this with our own really criminal negligence on these points! The glee with which we deliberately and flagrantly break the laws of this country—laws of all kinds—naturally makes it impossible to expect people to obey forest laws in particular. In this connection, therefore, it is psychologically inconsistent and practically absurd for a forester to expect people to obey forest fire regulations when they see him break traffic laws or laugh at the Prohibition amendment, and disregard many other of our regulations here in America. In Europe, laws and regulations mean something. If we are going to protect the forests of America we must take the same attitude here.

Another feature is the European's appreciation of the meaning of waste. The people of Europe quite evidently try their best to waste nothing. This, of course, reacts very favorably in forest management as people in general appreciate the value of the forest when they think of how evil it would be to waste any of it. For this reason one scarcely ever sees strangers wandering about in the woods in Europe, or lighting camp fires in the woods or close to them. The attitude seems to be one of respect for the proper use and careful conservation of the forest as property. They seem to say to

themselves "This is a valuable piece of forest and of course nobody will let anything injure it." Perhaps the fact that all the forests over there have been hand raised, at great cost, has much to do with respect of forest values in Europe. For this reason, perhaps it would be well for us to bear in mind the psychological value of plantations here in America. Good plantations, placed along public high-roads, with neat-looking signs calling attention to the plantation would go a long way towards raising respect in the minds of the traveling public.

There is also, especially in the mountainous country, a very real appreciation of the value of forests in controlling floods and in holding snow. The care with which the high mountains of Switzerland, for instance, are re-forested, at very high cost, and the detailed efforts to prevent snow slides, is astonishing to an American. We should bear in mind, however, that more than five thousand avalanches that have been located in Switzerland, and that the amount of damage done by these and snow slides is very much greater than an American would appreciate.

Another impression in regard to European forestry is that there seems to be a strong movement in favor of trying to keep the forest as nearly natural as possible. This means trying to get mixtures of species, both of softwoods, and of softwoods and hardwoods combined. Also, wherever possible, to substitute some form of partial removal, more or less approaching the selection system, for any clear-cutting method. This, to an American forester, was particularly interesting and

showed itself often and most impressively by the comparatively little disturbance created in the woods by whatever cutting is done. One passes through miles of forest which do not appear to have had any cutting done at all; only when closely observed is it noticed that there has been cutting in the past. The general appearance is that of an undisturbed natural forest, and of course very much more orderly and clean.

The fact that perhaps made as strong an impression as anything upon me was the enormous amount of material which could be sold at the present time, at a handsome profit, but which is held as growing stock. To the average American, who is accustomed to see timber cut off as soon as it is large enough to make a railroad tie or a piece of pulpwood, to walk through a stand of Norway spruce averaging some 140,000 board feet per acre, which will not be touched for perhaps ten or twenty years, is an experience never to be forgotten. Forestry in Europe, quite evidently, is the serious organization of the forest on a long-time basis, with the prohibition of expediency and opportunism as far as cutting is concerned. The natural result is to impress upon the visiting forester most forcibly the fact that an enormous amount of money is invested in the growing stock of a forest that is under real, sustained yield management. The possibility of such forestry in the United States quite evidently will mean a revolution in the thinking of American business men. To have such a large amount of forest capital standing perhaps for long periods, when it

could be used, is a temptation which the psychology of the average American would have much trouble in resisting. This point, coupled with the exceedingly low percentage of return in cash on the given investment is impressive. For instance, the net profit per year earned by the Saxon state forests is only about two and one-half per cent. The famous Winterthur forest in Switzerland returns a profit of only about three per cent or a little better per year on the investment in growing stock, etc., not counting in the land. This seems to be the case pretty much all over Europe, and, mind you, this in a region where there is practically no danger from forest fires, where the growing stock is already established so that properties are going concerns financially, and furthermore where the forester has a seller's market in which he is able to dispose of practically any material that he wants to cut and gets astonishingly high prices for it, in some cases as high as from \$25.00 to \$50.00 per thousand board feet on the stump, and yet the percentage of profit is only about two to three and one-half per cent at the best after centuries of careful, technical management.

These are the actual facts of the situation as they impressed me. To the American forester, faced with little or no growing stock to begin with, faced with expensive labor, a terrible fire menace and a demand for profits immediately and far in excess of European returns, all this tends to point away from the possibility of any widespread private enterprise in forestry from a purely commercial point of view, certainly in the immediate

future. Without question, from my observations of European forestry, I feel that forestry is a public enterprise rather than a private one, and the more we stress this in our program in America, the sounder will be the foundation which we are laying for the future of American forestry.

The visiting forester in Europe is also greatly impressed with the density of the stands in Europe, and at the same time with the lightness of the thinnings. When I first started through Europe it seemed to me as if all of the stands needed thinning at once. The point of the matter is, of course, that European foresters are growing just as much wood, of just as high grade as they possibly can on a given unit of area, and that forests can be grown much denser than we are accustomed to see them here in America.

The European spirit of carefulness is also a very notable point to the visiting forester. Every tree is handled with the utmost care. Nothing is smashed down if it can be possibly saved. The stumps are cut surprisingly low. Young growth is carefully avoided in hauling and all material is used to an astonishingly small size. The appreciation in Europe that even a small seedling is worth good, hard money is brought home very forcibly to the visitor. We have much to learn in this connection in the care of our young growth in America. Only too often we find ourselves thinking in derogatory terms of "brush" and young growth and failing to appreciate that they are all valuable parts of the forests.

Finally, perhaps the most outstanding impression I obtained, is that of



the permanency of the forest and of forestry in the minds of the people of Europe. It is not an experiment there and the people of all classes, in all countries, look upon it as something which is going to last long after they are gone. Forestry in Europe is a vitally important industry, firmly established in the national life. There are no doubts in the minds of the people there as to its importance and ultimate necessity. Therefore, forests are handled carefully for the life of the nation and not merely for the life of any one individual. The Sihlwald has been under some form of management for perhaps one thousand years. Its present technical staff of foresters have in their minds the realization that they are only steps in the age-long growth of the forest and that the long-run interest of the forest in all its details is the big thing. The result of this appreciation of the permanency of forests and forestry in Europe is very evident in many ways, especially in the splendid rock and re-inforced concrete culverts, bridges and dams one finds in the woods. Also in the fine road systems, which are so well kept up that most of them look like pleasure drives in some rich man's estate. Again it is evident in the heavy ex-

penditures made annually not only to keep up such roads as now exist, but also to expand the system so as to make the woods more accessible in every way and so increase the efficiency of the management. Forestry in Europe is there to stay, and the sooner we bring the people of America to the same attitude of mind, the better we will further forestry here.

One last word. I wish to express my warm appreciation of the kindness, consideration and helpful courtesy of our European colleagues throughout. There was nothing too painstaking for them to do, no question too involved for them to take the trouble to answer, and their hospitality and friendliness warmed my heart throughout my trip. Their desire to learn something about America and our forest problems, and their interest in what we are trying to do, is an excellent sign of increasing friendliness between us. The more we in America can keep in touch with our forestry brethren abroad, the more everybody will be benefited and our Society can in no small way do its part towards bringing about the coöperation and will toward international peace that we all so keenly desire.

# AMERICAN FOREST LITERATURE FROM A BIBLIOGRAPHY POINT OF VIEW

By JAMES L. AVERELL

*Southern Forest Experiment Station, Florida Branch*

The Forest Service is engaged upon a great task of compiling a bibliography of the American forestry literature. The list is already large. The officer to whom the work of sorting and classification was assigned reports here some difficulty caused by vague titles, and urges authors to use captions that are more descriptive of the contents of their contributions.

A BIBLIOGRAPHY of North American forest literature is being made by the Branch of Research of the U. S. Forest Service. It will represent America's contribution to a world forest bibliography.

Some interesting bits of information and side lights turned up while sorting the library cards and fitting them to the Society of American Foresters' decimal classification. For instance, the huge number of cards that were collected, the percentage discarded in weeding out the unsuitable references, the authors of the very early contributions and when the literature started building up rapidly, the "surprise" authors among them and the odd but popular subjects treated are points which have been noted down.

There were roughly 33,000<sup>1</sup> index cards to begin with which would make a pile of cards 18.5 feet high. These represent the North American literature on forestry and forest topics indexed in the Washington library of the U. S. Forest Service. Some of these references were also obtained from the Office of Forest Pathology and the Division of Forest Insect Investigation. By "North

American" is meant Canada, the United States including Alaska and the island possessions in the western hemisphere, Mexico, Central America and the West Indies.

Among the 9,000 discarded cards are found a number of one-page Consular reports telling of "The timber trade in Hamburg for the month of September, 1920" or similar bits of information not to be considered as a real contribution to American forest literature.

Another source of discard has been the multiple publication of an article in trade journals of the lumber, paper or wood working industries. Some of the articles, with slightly changed titles, have appeared in as many as four magazines. In such cases, the longest or the one in the most accessible publication or the one printed with illustrations was retained.

A third group eliminated is the highly popular type of article such as "Among the Clouds with the Flying Fire-fighters" or some similar fancy caption. Air plane fire patrol is a very common topic used by starving authors. Other forestry topics apparently readily sold to "fresh air" magazines are the

<sup>1</sup>This figure is a close approximation arrived at by counting the number of library cards to an inch and multiplying by the height of the stack of cards which would be 220 inches or 18.5 feet.

Sequoia or Big-trees of California, timberline-tortured trees and the why of prairies. An odd topic tremendously popular twenty-five years ago was Eucalyptus planting in California. There are almost fifty treatises in the bibliography including a 200 page book on this "wildcat" scheme.

When one makes a contribution to American forest literature, one joins an assemblage of authors who come from all walks of life. Presidents of our country as well as college presidents, Congressmen, scientists, sportsmen and governors, together with ordinary dirt foresters, have all manipulated pens that we might have forestry facts and opinions. Among the surprising contributors to American forest literature are John Muir and John Burroughs, James Oliver Curwood, Stewart Edward White and Zane Grey, James J. Hill, Walter Hines Page, Carleton Parker and Henry David Thoreau. As yet, Sinclair Lewis has not written the denouement of the forestry profession's private life!

Some of the earliest American writing on forestry is contained in the annual reports of state horticultural societies from the prairie and New England states. For example, in 1874, the committee on forestry of the Iowa Horticultural Society made a 12-page report on forestry and in the same year the Ohio Society reported its findings on forest tree planting. This is over 56 years ago!

In 1878, Franklin B. Hough reported upon, "Forestry: from the committee appointed to memorialize Congress and the state legislatures, regarding the cultivation of timber and the preservation of forests".

The *American Journal of Forestry* (not the present JOURNAL OF FORESTRY), a monthly periodical devoted to "the interests of forest tree planting, the formation and care of woodlands and ornamental planting generally, and to the various economics therein concerned", was started in September, 1882 under the editorship of Franklin B. Hough, Ph.D., the first Chief of Forestry Division, U. S. Department of Agriculture. But it lived only one year.

In 1898, the Wisconsin State Forestry Commission made a 41-page report on the need of forest fire protection in Wisconsin, forest tax legislation, denuded lands and public versus private management of forests. How familiar those topics sound to us today.

By 1899, Gifford Pinchot had begun his list of 160 or more contributions to the American forest literature. In 1903, Raphael Zon "opened up" and he now has over 120 publications and is still "going strong".

About this time the sky became illuminated by a whole galaxy of forestry literary luminaries and they have become more numerous, until now the annual list of publications must equal that of many far older professions. Last year (1930) there were approximately 1650 North American articles, bulletins or books cataloged at the Forest Service library. Of these, over 100 were included in the North American bibliography. A goodly number came from Canada; Mexico is still a very limited contributor.

The literary channels used to disseminate this forestry knowledge are interesting. Many magazines besides the usual forestry publications have been used. Among the list are found the



*Saturday Evening Post*, *Munseys*, *The American*, *Worlds Work*, *Colliers*, *Outlook*, *Harpers' Magazine*, *Sunset* and even the scholarly *Atlantic Monthly*. One brave soul rose to sufficient freedom of thought to scale the editorial wall of *American Mercury*! *Putnam's Magazine*, *McClure's* and *Maxwell's Talisman* often contained contributions by the early forestry writers.

There are two difficulties encountered in building up a forest bibliography. The first is that of limitation—where should forest literature stop and that of the exact sciences or specialized subjects begin. For instance, physiology and taxonomy have a voluminous literature bordering on forestry, and the grazing experts are an example of the specialized field. The thousands of articles written on grasses and stock which are of fundamental interest to the grazing man, quite overshadow the tree literature. In this case the grazing men are compiling their own bibliography to supplement the limited representation of their subject in the forest bibliography.

The second difficulty, which is chiefly the fault of the authors, is that of vague titles. A title that leaves the reader guessing as to contents may act as spice to his jaded literary appetite, but it also jeopardizes correct filing in the numerous forest libraries. If a librarian has to read all of the 1500 forestry contributions a year in order to judge how they are to be indexed, then a great danger exists that some of the pearls of thought and research will not find

their proper filing place. And the fault lies with the author, and the editor who allows it.

It has been said that a successful literary effort depends on a "snappy" beginning, a strong ending, and just enough filling between. However true this may be it is certain that a provocative opening is always enjoyable. But this should not begin in the title! An inscrutable, piquant title in a worthy contribution is uncalled for.

A few examples of inexplicit titles which appeared in a day's sorting are listed here: "Your own back yard", "Forestry and the newspapers", "Going after that 40 per cent", "The big six and the house that Jack built", "American timber and lumber", "The next generation", "Experimental investigations on birch and oak", "Pulp wood on cut over land", "What ails New England forests"? "When trees grow", and "The farmer and his out-at-elbows woodlot".

If you find one of your brain children in the above sample, do not become violent but in the future strive to write titles that are of some use as "handles" to your articles. There are a large number of titles in the bibliography just as puzzling as those in the sample given.

The 24,000 cards now indexed according to the Society's decimal system will be sent out by subjects to specialists in the various forestry subjects for final examination as to omissions and corrections of filing. It is hoped that the final classification can be published soon.

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EDITOR'S NOTE: Catchy and provocative titles should not be condemned because they cause difficulty in indexing. They have their place, particularly in articles of particular current interest intended to invite immediate perusal and to provoke thought and discussion.

## DROWNED FORESTS

By WARREN F. HALE

*Assistant State Forester, New Hampshire*

An ancient forest along the north Atlantic Coast was drowned by the sea, the method of whose encroachment is not established. The species represented included white pine, hemlock, beech and southern white cedar. This submerged forest is of interest to foresters and paleontologists who are students of the tree growth of the past, and to geologists as a link with past land forms or movements.

AN INTERESTING fact to foresters as well as to geologists and botanists is the discovery of stumps and logs along the Atlantic coast which were drowned long ago by the sea. These stumps in most instances have been discovered well below high water mark and in several locations in the Bay of Fundy are from 20 to 30 feet below high tide. They stand firmly rooted and in a well preserved condition. Their presence has caused much speculation as to their origin, age and length of time under water. Only two explanations of their presence can be assigned, (1) coastal subsidence and (2) the rise of the ocean level. Recent scientific investigations along the coasts of Massachusetts, New York and New Jersey seem to indicate that there is no good ground for the assumption that coastal subsidence is still in progress. Some geologists believe that thousands of years ago the ocean level rose because the sea received a large volume of water which had been locked up in the ice-sheets during the Glacial Period. It has been estimated that the ice-sheet of North America and Europe covered not less than 6,000,000 square miles. Assuming that its average thickness was 3,000 feet, its melting would have raised the sea level about 225 feet. There may have been no change of the ocean level during the past 2000 years.

In order to study these problems, Professor Charles J. Lyon, Botanist, and

Professor James W. Goldthwaite, Geologist, both of Dartmouth College, are collecting sections of these stumps and logs and measuring the tree rings. Funds for this work were obtained from the Carnegie Institution of Washington, D. C. and the American Geographical Society of New York. Submerged stumps and logs of sufficient size and numbers were located near Provincetown, Massachusetts, Rye Beach, New Hampshire, Scarborough, Maine, Amherst and Grand Pre, Nova Scotia and several other places. Assistants were engaged to help in this work and the writer was asked to do part of the mapping and charting. This work could only be done at extreme low tide when the stumps were exposed.

On July 20th, Odiornes Point, Rye, N. H., was visited. The stumps were located in a shallow basin, were mapped, and levels obtained from high water mark. The principal species seemed to be pine and hemlock. Several logs from 10 to 12 feet in length were located buried in the sand and excellent sections were obtained by sawing off one end. The bark on the under side of these logs had turned red and beneath the logs was found humus containing bits of wood and leaf mould. All of the stumps whose diameters were from 3 inches to 12 inches were sound, having their roots firmly planted in the sand and above rocks. No evidence was obtained that these stumps and logs had been brought in by winter storms and buried there.

All were in their natural position and no indication of axe or saw marks were noted.

A small party during August proceeded to Fort Lawrence, Amherst, Nova Scotia to study conditions there. Prof. John W. Dawson in his book *Acadian Geology* observed and reported on these stumps in 1854. His description of the forest is most interesting and in part is as follows:

"It occurs on the edge of the marsh near the mouth of the LaPlanche river at the extremity of the Fort Lawrence bridge, which separates the LaPlanche from the Missaquash. At low tide, a sloping expanse of red mud, in places cut into furrows by the tides, and in other places covered with patches of soft, recently deposited mud. At the distance of 326 paces from the abrupt edge of the marsh and about 25 feet below the level of the highest tides, which here rise in all about 40 feet, I saw the first of the rooted stumps, which appear in a belt of sand, gravel, and stones mixed with mud, which intervenes between the slope of mud already mentioned and the level of low tide. Beyond the stump first seen and extending to a depth of at least 30 to 35 feet below the level of high tides other stumps were irregularly scattered as in an open wood. The lowest stump seen was 135 paces beyond the first; and between it and the water-level there was a space of 170 paces without stumps, but with scattered fragments of roots and trunks. On digging under and around some of the stumps, they were found to be rooted in a soil having all the characteristics of forest soil. In one place it was a reddish, sandy loam, like the ordinary upland of Fort Lawrence; in another place it was a black vegetable soil resting on a white, sandy subsoil. Immediately over the soil were the remains of a layer of tough bluish clay, with a few vegetable fibres, apparently rootlets of grasses, which seemed to have been the first layer of marsh mud deposited over the upland soil. All the rootlets of the stumps were entire, and covered with their bark, and the appearances

were perfectly conclusive as to their being in the place of growth. Of thirty or forty stumps which I examined, the greater number were pine (*Pinus strobus*) but a few were beech (*Fagus ferruginea*), and it is worthy of note that these are trees characteristic rather of dry upland than of low or swampy ground. The pine stumps were quite sound, though somewhat softened and discoloured at the surface. The beech, on the other hand, though retaining much of the appearance of sound wood in the interior, was quite charred at the surface, and was throughout so soft and brittle that large trunks and roots could be cut through with a spade or broken with a slight blow. Owing to their softness, the beech stumps were worn down almost to the level of the mud, while some of the pines projected more than a foot; even these last were, however, much crushed by the pressure of the ice, which, with the tides, must eventually remove them. The largest stump observed was a pine 2 feet 6 inches in diameter; and showing more than 200 annual rings of growth."

Prof. Lyon's party had no difficulty in finding these same submerged stumps and spent several days in examining them. Fourteen logs and 209 stumps were accurately located and their levels obtained. Practically all of them were from 20 to 30 feet under water at high tide and over half a mile out on the beach. The tides in this section of the Bay of Fundy average forty feet. The diameters of these stumps ran from three to twenty-six inches. Two men labored during three low tides to saw off the top of a 26-inch pine stump. This specimen was the best and largest collected. The annual rings were plainly visible except for a two-inch hole at the center. The composition of the beach was a very soft red mud lying on a sticky blue clay, making the work of examining very difficult. There was every indication of a normal forest here once upon a time.

From Amherst the party proceeded to Grande Pre beach across Minas Basin on



the south. This collection of stumps was scattered for almost a mile along the "Guzzle" which runs between the main land and Boot Island. Thirty-eight logs and 77 stumps were accurately located and levels obtained from high water mark. Some of the largest and best specimens were found on this beach. All stumps and logs were from 20 to 35 feet below high water mark. Beech, oak and probably elm were identified besides pine and hemlock. The writer located a group of 18 stumps on the westerly side of Boot Island and more than half a mile out on the beach from high water mark. The specimens were well preserved and in excellent condition. There was every indication that all of the trees on Grand Pre beach had grown naturally on this site and had been gradually drowned by the sea. The encroachment of the sea killed the trees and broke off many of the trunks, leaving the stumps and logs as they are found at the present time.

In September, trips to Scarboro, Maine and Provincetown, Massachusetts were made and similar conditions found. The stumps were not so numerous, but were well preserved. At Scarboro the stumps were located at the edge of a marsh and not out on the beach. The Provincetown stumps were inside the tip of Cape Cod and not exposed to the severe coastal storms. The specimens were solidly rooted and seemed to be in their place of growth. A pine log about 10 feet in length and 12 to 15 inches in diameter was found. The bark on the under side was more than one inch thick. After much difficulty a section of this log was ob-

tained showing annual rings very clearly. The age of the specimen was about 922 years. This log probably was part of a nearby stump.

All specimens collected on these trips were crated and shipped to Dartmouth College, Hanover, N. H., for study by Professor Lyon this winter. Later he will publish a report covering all phases of the work.

An interesting side light in this work was noted by the writer on the trip to Provincetown, Massachusetts. Discussing this problem of drowned forests with the fire lookout watchman at Wellfleet, Massachusetts, a third party in the tower stated that there were many stumps dug up by a dredger near Granville beach, Centerville, on the south shore. After much searching a dredger was located and with the assistance of one of the workmen an examination was made of about 200 huge stumps piled up on a beach nearby. This dredger during the month of May was engaged in widening a river channel 500 feet in length by 60 feet wide. Six feet under low water the dredger began to raise to the surface huge stumps and logs. Some were so large and bulky that difficulty was encountered in getting them loaded on a scow nearby. One large specimen appeared to be over 4 feet in diameter at the butt with a massive tangle of roots. A specimen was sent to the Forest Products Laboratory at Madison, Wis., and identified as southern white cedar, (*Chamaecyparis thyoides*). Further studies will be made later to determine, if possible, their origin.

# SOME PROBLEMS IN FOREST EDUCATION<sup>1</sup>

By HENRY SCHMITZ

*Chief, Division of Forestry, University of Minnesota*

This article concerns education in forestry mainly from the standpoint of training for the federal services, and as such is addressed primarily to the Civil Service Commission.

A FOREST is not a group of independent trees. It is a plant community and, indeed, perhaps the most highly developed and complex of all plant communities. Not only do the individual trees of a forest influence each other, but independently and collectively they influence most, if not all, environmental factors. An adequate concept of a forest must therefore embrace a consideration not only of the ecology, anatomy and physiology of the trees themselves, but also a consideration of other woody and herbaceous plants, the soil, the fauna and flora of the soil, forest animals, and the various climatic factors.

Forestry as an applied science is even more complex than the forest itself. The forester must deal not only with the forest complex, but he must deal also with a host of economic, political, social and industrial problems influencing both the growing of timber crops and their utilization.

It is with the question of training men, especially for the national service, and adequately preparing them to cope with these problems that we are concerned today.

Contrary to a widespread belief, forest education is not a recent development. In Germany, forest education dates back to about the middle of the 18th century. Prior to that time in Germany the education of foresters was comparatively simple and was mainly directed to learning the regulation of the chase. Early in the 18th century, however, the need for

better woods knowledge became more pressing, and as a result a "Master School" arose in Wernigerode in 1763 with von Zanthier as director. Shortly thereafter the two great masters and the fathers of modern forestry, Cotta and Hartig, established "Master Schools," the former in 1785 and the latter in 1789. The school established by Cotta was later transferred to Tharandt and became a state institution.

In France, a forest school was established in 1825 at Nancy. This school is still in existence and is highly regarded not only in Europe but in America. In Sweden, a state forest institute was established in Stockholm in 1828. Italy established the Institute Forestale at Vallambrosa in 1866, while England's first attempt at forest education was made in 1835 when a chair of forestry was established in the Royal Engineering College at Coopers Hill.

In America, a general belief in the myth of the inexhaustibility of forest resources delayed forest education almost until the beginning of the present century.

The University of Minnesota was one of the first American universities to seriously interest itself in forest education. On January 13, 1881, the late William Watts Folwell, the first president of this university, presented to the Board of Regents the following resolution: "that the Professor of Agriculture be requested to prepare a detailed statement whereby the advantages of a separate and special

<sup>1</sup>Presented at Conference on University Training for the National Service, at Minneapolis, July 14-17, 1931.

school of forestry be offered in the agricultural college of the University." This is one of the earliest instances of an American university interesting itself in forest education.

It was not until 1898 that the New York State College of Forestry was established at Cornell University. The Yale Forest School was established in 1900. At present some thirty-four institutions offer professional work in forestry.

Although a distinct forestry department was not organized at the University of Minnesota until some years later, courses in forestry were offered in the department of horticulture by the late Professor Samuel B. Green as early as 1899. Professor Green's book, *Forestry in Minnesota*, is one of the earliest American textbooks on forestry.

At first, European facts and experiences were the basis of American forestry education. As time went on more and more facts concerning our own forests and their management were collected. At the present time an extensive North American forestry literature is available. The establishment of the regional forest experiment stations gave a great impetus to forest research.

Naturally an educational development as young as forest education has flaws and imperfections. Of these forestry educators are generally aware. But problems of personnel, of adequate financial support are not always easily or quickly remedied. Probably the most urgent and pressing of all forest educational problems is the training and selection of competent teachers who not only can take their place among their scientific colleagues, but at the same time have not lost touch with the social and economic relations of forestry.

Before making any concrete suggestions concerning the improvement of the general standard of the training of men entering the national service it is necessary to examine, even if this can be done

only in a sketchy way, the organization of the Forest Service. In Washington, under the direction of the Chief Forester and Associate Forester there are seven administrative branches as follows:

Branch of Operation.

Branch of Management.

Branch of Range Management.

Branch of Lands.

Branch of Research.

Division of Silvics.

Division of Range Research.

Division of Forest Products.

Division of Forest Economics.

Division of Forest and Range Experiment Stations.

1. Allegheny Forest Experiment Station.

2. Appalachian Forest Experiment Station.

3. California Forest Experiment Station.

4. Central States Forest Experiment Station.

5. Intermountain Forest Experiment Station.

6. Lake States Forest Experiment Station.

7. Northeastern Forest Experiment Station.

8. Northern Rocky Mountain Forest Experiment Station.

9. Pacific Northwest Forest Experiment Station.

10. Southern Forest Experiment Station.

11. Southwestern Forest Experiment Station.

Forest Products Laboratory.

1. Section of Silvicultural Relations.

2. Section of Derived Products.

3. Section of Pulp and Paper.

4. Section of Timber Products.

5. Section of Timber Physics.

6. Section of Wood Preservation.

7. Section of Industrial Investigations.

8. Section of Pathology.



9. Section of Publications of Results.

10. Section of Laboratory Operations.

11. Section of Finance and Accounts.

Branch of Engineering.

Branch of Public Relations.

Division of State Cooperation.

Division of Information.

In addition there are in the field nine national forest regions in charge of regional officials who administer some 150 national forests embracing over 160 million acres of forest land. These national forests are scattered from Alaska to Florida and from New Hampshire to California. The administration of these properties involves regional and local problems in silviculture, range management, fire protection and suppression, protection against insect pests and numerous diseases, range improvement, utilization, public relations, land exchange, recreation, game preservation, and a host of others.

The forest schools have attempted to train men to cope with all of these various problems. Is it any wonder that they may not have been conspicuously successful.

Personally I have no fault to find with what has happened in the past. The development of the national forest system was rapid and the demand for men urgent and great. On the whole, the forest schools have trained fairly competent forest practitioners imbued with a fine sense of public service and responsibility.

In my opinion, however, we are now entering a new era. The pioneer stage, at least in federal forestry, has in a large measure passed. The urgency for men in the national service is lessening. Quality rather than quantity in men is needed. In part at least a new type of training is required, a training involving not only adequate technical preparation, but a broad liberal background and advanced

specialization. The time has arrived for forest educators and the Forest Service to more clearly recognize that there are required in the Forest Service at least two distinct types of men; the forest practitioner and the specialist. The forest practitioner will find his opportunities largely in the administrative fields of the Forest Service; the specialist in the various fields of research. There are, to be sure, a large number of positions in the Forest Service, the training requirements for which are not now clear.

That some recognition is given to the fact that at least two types of men are required in the Forest Service is indicated by the various civil service examinations announced from time to time. During the past year, for example, examinations were held for the following positions: principal silviculturist, senior silviculturist, silviculturist, senior forest ecologist, forest ecologist, senior forest economist, economist, and others.

For many of the positions either (a) the Ph. D. degree and three years of responsible and successful experience in research, or (b) six years of responsible and successful experience in research are required. The alternate requirement (b) is of interest. Apparently three years of responsible research are considered by Forest Service officials to be equivalent to the Ph. D. degree. There are perhaps some good reasons why this substitute for the Ph. D. degree is permitted. We are in a transitional stage and a sufficient number of men having both the degree and adequate experience is undoubtedly not available. The time must come, however, when the training represented by the Ph. D. degree or its equivalent, except in unusual cases, will be a prerequisite for an important research post.

Drs. I. W. Bailey and H. A. Spoehr, who made the recent survey of the role of research in the development of for-

estry in North America for the General Education Board, state "it can not be too strongly emphasized that the future welfare of research in the forest experiment stations is dependent upon the selection and adequate training of an unusually able and outstanding group of investigators." With this statement no one can take exception. Nor will any one deny that graduate study contributes to the training of investigators.

Dr. Stockberger in his address has shown that but 5.1 per cent of the professional employees of the Forest Service have the Ph. D. degree. This average figure is of no particular significance, because most of the technical employees of the Forest Service are engaged in its administrative duties. Many of those who have this degree are connected either with the Forest Products Laboratory or the regional forest experiment stations. A rather cursory analysis of the personnel of the regional forest experiment stations indicates that about nine or ten, or approximately ten per cent of the professional employees of these stations have the Ph. D. degree. With one or two exceptions, those who have the degree are younger men, but this is only to be expected because the advanced degree for foresters is a comparatively recent development.

There seems to be some disposition on the part of the Forest Service to recruit forest experiment station workers from the junior forester register. This may, of course, be an emergency measure, but nevertheless, it is a mistake in the long run. It will result, unless further training of these men is anticipated, in filling up research positions with inadequately trained men.

It is in the training of forest specialists that the universities can be of greatest help to the national service. The adequate training of practitioners is important; the adequate training of specialists vital, the training of these specialists is

not the problem of forest schools alone. The forest schools should, and must, have the coöperation, and active participation of other departments of the university even in the undergraduate training of these men. There is no good reason why the forest schools as administrative units should endeavor to build up by themselves all the special fields of forest education. In most cases this would compel them to spread themselves even thinner than they now are.

Specialists in forestry, such as forest pathologists, forest entomologists, forest chemists, and many others can be given the best graduate instruction in the department where the underlying science is pursued in the broadest and most thorough manner. This does not mean that there is no opportunity to specialize in forestry as such. Silvics, silviculture, forest finance, and forest management at least lend themselves to graduate training quite as well as other biological and social sciences. In any case, the schools of forestry must coöperate and participate in the graduate training of forest specialists, or the training of these specialists may run too far afield and the specialist himself lose the forestry viewpoint, which is the real and vital thing.

I have already made reference to graduate work in forestry proper. It is here that the forest schools are having their greatest difficulty. As a rule forest school staffs are small and the instructors by training, experience and inclination are themselves practitioners rather than specialists. The training of specialists by general practitioners is educationally unsound. In some quarters a change, slow to be sure, is taking place. Instructors, although compelled to teach a wide variety of subjects, are beginning to concentrate their research activities in a rather limited field. All too often, however, we still find coming, from a single man, publications dealing with almost every conceivable subject. In all cases this is not

the result of institutional policy, but of individual preference. In either case, however, such an environment is not conducive to broad and thorough study or does it create an educational atmosphere attractive to scholars. At Minnesota we have learned much and gone far in the matter of inter-departmental coöperation. Forest specialists have been trained in the manner just described and there are no administrative difficulties.

It is in connection with the junior forester requirements and examinations that the Forest Service through the Civil Service Commission can exert a most profound influence on the forest schools. This influence may be either propitious or inauspicious.

The last announcement of the junior forester examination, like former announcements, specifies that to be eligible for this examination, the candidate must show either that he has, or will (during the life of the eligible register), graduate from a four-year course in a forest school, or that he has graduated from a high school and has had four years' practical experience in forestry work in the field. The inference is, of course, that four years practical forestry work in the field is essentially equivalent to graduation from a forest school. There is little or no foundation for such an assumption, and to the best of my knowledge it is not made by European countries in which high standards for forest personnel are maintained. In France, for example, an active service of fifteen years is considered equivalent to the education in the forest school for advancement in the forest service.

It is only fair to say that this alternative requirement undoubtedly has a desirable effect on the morale of non-college graduates already in the Forest Service. Perhaps a way should be left open for them to attain higher technical ratings in the Service. To permit new men to enter the Forest Service through the four-year

practical experience route, is, however, a doubtful expediency. The important question is not whether all aspirants to technical positions in the Forest Service should be forest school graduates, but whether four years of practical experience is equivalent to a four years' technical course in forestry.

The junior forester examination, which is the principal means by which graduate foresters enter the Forest Service, is largely technical in character. There seems to be some disposition among foresters to rate the forest schools on the basis of the success of their graduate in passing this examination. In certain institutions this concept has a profound influence on forestry curricula. Cultural and humanistic courses ordinarily conceived to be an essential part of any college course are neglected in order to permit time for a greater number of technical and practical forestry courses. If this drift continues, forest education will be reduced to trade school level and eventually will have to justify its place in the university. As a general rule students who enroll in the forestry courses are already too vocationally minded. In this they need no encouragement. What they do need is a keener realization and appreciation of the attributes of an educated man.

At the present time a general knowledge of history, government, sociology, certain basic sciences, foreign languages, etc., does not materially help a candidate in passing the junior forester examination.

As the competition for Forest Service positions becomes keener, there is some danger that even the technical courses in forestry will be influenced by the type of questions asked in the junior forester examinations. There may be a tendency to include in the technical courses taught in the forest schools only such material as is likely to be of value in passing the examination. Broad, general principles



may be neglected. The cultural aspects, and there may be many in forestry courses, may be sacrificed for immediate and practical considerations.

I hold that our first responsibility in forest education is to maintain standards of scholarship and curricular requirements equal to those of other university departments. The cultural and humanistic aspects of education should not be sacrificed for the technical and practical aspects. There are many problems. The length of the course is not the least of these. Perhaps a five years' course instead of the conventional four years' course is part answer.

In conclusion, let me summarize briefly my conception of how the Forest Service may beneficially influence forest education.

1. In general, require technical training for all technical positions.

2. Clearly distinguish between the training of forest practitioners and forest specialists.

3. In selecting forest practitioners, give consideration to general as well as technical training.

4. Require special training for forest specialists, this special training not to be included in the four-year undergraduate course, but in graduate work in the special fields.

5. Insofar as possible, require undergraduate training in forestry for forest specialists.

6. Establish closer relationship between the forest schools and the various federal departments employing forest school graduates in order that the personal qualifications of prospective candidates for civil service positions may be carefully scrutinized and weighed.



The district ranger has his place in the national-forest community and is closely identified with its civic affairs, because he is the representative of a Federal service whose business of producing timber for the sawmills, protecting grazing ranges, suppressing fires, building roads, trails, telephone lines, and other forest improvements, preserving wild life and forest scenery, is all important to community prosperity.

S. B. SHOW.



## BRIEFER ARTICLES AND NOTES



### FORESTRY AT THE LAND UTILIZATION CONFERENCE<sup>1</sup>

Forestry was given much prominence and publicity last November. First, due to the elections in New York State and later because of the land utilization conference held November 19-21 in Chicago. The Chicago conference was called jointly by the Secretary of Agriculture and the Association of Land Grant Colleges and Universities. While the purpose of the conference was the consideration of essential steps toward a national policy of land utilization and the bearing of such a policy on problems now confronting agriculture, forestry received much attention especially as a use for unnecessary or marginal farm lands and because of its bearing on waters and on erosion. As a major corrective of the present situation of planless development and use of land, the speakers emphasized the need of carefully worked out long-time land-use programs. Indeed, intelligent long-time planning was the underlying theme of the recommendations for a sound land-use policy. The place of forestry in the land utilization program and how forestry can contribute to agricultural prosperity was discussed by several speakers; others reported the experiences and plans of New York, Wisconsin, Michigan and other states in dealing with submarginal farm areas. The Society of American Foresters was especially invited by Secretary Hyde to participate in the conference. Executive Secretary Franklin Reed represented the

Society and served on the Committee on Summaries and Conclusions. Some of the salient points made by a few of the many speakers addressing the conference follow.

### HYDE WOULD SHUT DOORS AGAINST FARM EXPANSION

Secretary of Agriculture Arthur M. Hyde, in making the opening address at the conference, hoped for the day when there will be "proper supervision of colonization schemes," when settlers can be "truthfully apprised of the economic facts," and when "Uncle Sam will refuse to deed 640 acres of sand and cactus to a man, no matter how courageous and industrious he may be," and asked that the Nation formulate a sound national policy of agricultural land utilization.

"We have made, over the last 10 years, a good many studies of various segments of the national problem of land use," Secretary Hyde said. "So have many of you. The object of this conference is to get all these studies out in the open, to compare and discuss them, and to check them against observation and experience in field, forest, and farm. We shall probably discover a host of conflicting opinions and interests. Facts are stubborn things, even those of mere local application. We can not afford to be dogmatic."

The need for this land-utilization conference, the Secretary continued, "lies in the vast waste of human and material resources now taking place in our rural

<sup>1</sup>Recommendations made by the conference appeared in the January issue of the JOURNAL OF FORESTRY, on page 115.

areas. Erosion has already gashed and gullied our countrysides and ruined 21,000,000 acres beyond repair. The wastage of natural resources in the East and South has already sapped the economic strength of communities and farmers and small towns. Every one of these presents problems of economic readjustment and political reorganization which might conceivably change a loss into a modest profit. Thousands of pioneer souls have listened to the siren song of the expansionists and have followed their land hunger into arid regions or onto cutover lands which Nature intended for other purposes than farms.

"Suggestions have come from various sources that the answer to the problem of submarginal lands is purchase and reforestation by the Government. There probably are areas which possess so high a value for national uses that they should be acquired. National uses, under our present policy included watershed protection, national forests, parks, and game preserves. Possibly sound policy would include acquisition to stop erosion and to conserve the soil for future generations. There are other areas where the continuance of the economic life of whole communities depends upon the maintenance of some national resource, such as forests, which provides raw materials and employment to farmers and workmen in small towns.

"In such instances acquisition may be justified, either by federal or state governments, or jointly, but to purchase all of the submarginal areas is hopelessly impossible."

In questioning the advisability of any sweeping purchase of submarginal lands by governmental bodies, and to allay the fears of those who expect a modern hegira from the submarginal areas, Secretary Hyde declared:

"There is probably more hope of success in slamming shut a few doors

through which expansion is flowing than there is in the recapture of acreage. Most of the expansion takes place in four directions: drainage, irrigation, clearing of forests, and dry land farming. The extent of that expansion is not generally recognized. There are both dynamite and enlightenment in the statistics, taken from the census, that there were 84,000 fewer farms in 1930 than in 1925, but there were 15,000,000 more acres in crops. This in five years, and the last five years at that! There are both pathos and problems in the fact that the 366,000,000 acres planted to crops in 1930 was 55,000,000 acres more than our cultivated area in 1909, and larger than the wartime peak of 1919.

"We must start sometime. No program which we can conceive will immediately cure the present emergency. A long-time land-use program can not write an immediate answer to the present emergency, but the present emergency emphasizes the immediate need for a long-time program. If we had begun even so short a time as 20 years ago—before the expansion of our cultivated area by 55,000,000 acres—how much of tragedy and distress might have been prevented! If we could have prevented the entry of the submarginal portion of those 55,000,000 acres, or could have held in abeyance such portion as was not economically needed, what a different story we could write for American agriculture!"

Whatever land-use policy is formulated, the Secretary pointed out, it must be elastic enough to fit constantly a changing economic environment. The old epic of land settlement, he said, is about over. "We have come now to the time when we should write a new epic," he said, "the epic of adjustments, of regrouping, of retirement from cultivation of lands which the pioneer subdued, but which stubbornly refuse to yield to his grandchildren a reasonable standard of



living, of development of parts of our great patrimony and of conservation of other parts; in short, the epic of conserving a hard-working, God-fearing, agricultural people—proud to be, as in fact they have always been, the mainstay of a great people, the nursery of a great race.”

#### FORESTRY INCLUDED IN 10-POINT PROGRAM FOR SUBMARGINAL FARM AREAS

A 10-point program for areas in which submarginal lands have been abandoned or are about to be abandoned, was presented to the conference by Dr. L. C. Gray, in charge of the division of land economics, Bureau of Agricultural Economics, U. S. Department of Agriculture.

Pointing out that a primary task in developing a land-use program for any community “is to determine how far we can go in turning submarginal farms or forests into supermarginal businesses through modifications in the tax system, and through adjusting the farm plant and organization to present-day requirements,” Doctor Gray suggested the following ten lines of action for submarginal areas:

1. Readjust the tax burden and methods of taxation to conform to uses for which land is adapted and to tax-bearing ability of each class of land.

2. Develop a forest crop law or some equivalent through which the state will share with individual and community the burden of maintaining timber until maturity.

3. Encourage evacuation by educational programs for sparsely occupied areas where costs of local services are greater than the value of occupied tracts. In some cases public acquisition of the land, by joint county and state action, may be best.

4. Zone against resettlement, submarginal areas that have been evacuated. This would also apply to areas not yet occupied but unsuited to farming.

5. Discontinue attempts to sell tax delinquent lands unsuited to private utilization. Where resales are unavoidable, restrict them to areas where they will not entail an undue burden for public services.

6. Consolidate areas acquired by tax delinquency into units suitable for administration, either by exchange or purchase.

7. Provide an adequate program of fire protection for both private and public lands, and determine a sound program of use for public lands, for forests, recreation, grazing, or the like.

8. Encourage by education and demonstration a sound type of forest and woodlot management on areas adapted to private utilization. Coöperative management of consolidated areas, coöperative cutting, hauling, and marketing may be feasible.

9. Revise the institutional set-up of the community, planning the location of schools, roads, and other utilities to conform with the revised land use program.

10. Regroup units of local government and redistribute governmental functions, not only as between state and local governments, but also through coöperation among counties and other local units in supplying various kinds of public service. In some a greater contribution from state resources will be necessary.

This sort of program, Doctor Gray admitted, will take years to develop. A few states, however, have already taken the first steps.

“I do not subscribe to the point of view sometimes voiced,” Doctor Gray declared, “that the federal or state governments should take over all the extensive areas of cut-over or other marginal lands that are virtually idle. We should certainly go as far as we can in modifying methods of taxation and other conditions to enable private enterprises to utilize

these lands in ways reasonably consistent with the public interest."

#### STUART CALLS STABILITY CHIEF NEED OF FOREST POLICY

Major R. Y. Stuart, chief of the Forest Service, in his address before the conference asked for a land utilization program that will insure stability of use for the Nation's acres in forests.

"Stable use is reasonably assured for most of the approximately 100 million acres of forest land that is now owned by the public," Major Stuart said. "The national forests and national parks are not likely ever to be turned over to other forms of use, if public sentiment continues vigilant to safeguard them against schemes or measures endangering their integrity. The same can be said of the state forests and parks in those few states which have definitely and permanently dedicated them to forest use by constitutional or legislative enactment."

In very few states, however, Major Stuart pointed out, is there a definite policy on the use of land that reverts to the state or counties as a result of tax delinquency. "Most of them," he explained, "endeavor to return the land to private ownership, without regard to its economic possibilities, and without any assurance that the process will not be repeated after a few years. . . . One of the first steps that should be taken is to formulate definite policies for stabilizing the ownership and use of unreserved forest land now owned by counties, states, and federal government, and of that which is returning to public ownership. Such land should not be alienated unless it can be depended on to remain in private ownership and to be utilized in a way that will not conflict with the public interest."

The bearing of forest policy on the future of American agriculture is appar-

ent, Major Stuart declared, when it is realized that forests occupy nearly half of the land that is potentially available for future expansion of the crop area. At present the forest area, comprising one-fourth of the land area of the United States, is larger than the combined area in crops and improved pasture. One-seventh of all the land in farms, and east of the Mississippi River more than one-fourth, is woodland.

The major objective of a forest policy, Major Stuart said, "is to keep existing forest land in such a productive condition that it will furnish needed supplies of timber, conserve water, check erosion of the soil, and conserve recreation values and wild life, and to keep the land from being diverted to other uneconomic uses which would threaten the welfare of existing agriculture."

"Forest cover can be destroyed and the land utilized for crops or pasture on very short notice," he continued, "but once the cover has been destroyed, it is not so simple a matter to return the land to forest use, either for timber production or even for protective cover. For this reason, stability of policy is essential if the land is to be used for forestry. . . . Stability of policy requires either a fairly strict public control over the use of the land or a considerable degree of stability of ownership.

"The ownership, and consequently the policy of utilization of much of the privately owned forest land, and of some of the publicly owned, is essentially unstable. East of the Great Plains approximately 95 per cent of the forest land is in private ownership, and in the West, about 25 per cent. . . . A large area, roughly one-third of all the privately owned forest land of the country, belongs to farmers."

Land on which forestry can be made to pay, and which is now privately

owned, should remain in private ownership, Major Stuart maintained, unless there are special reasons for its acquisition by the public. For farm woodlands and other small holdings, in his opinion, it may be possible to reduce costs and increase returns through the development of coöperative management and marketing.

"Any attempt at this time to estimate the area of forest land that should be acquired by the public would be futile," Major Stuart asserted. "All that can be said is that the area is very large—much larger than has been contemplated in any program hitherto proposed. . . . In general, the federal government should acquire mostly those lands which either can be managed best in connection with existing national forests, or which have an influence upon the flow or the silting of interstate or navigable streams. Acquisition of other lands should be left mainly to the states, counties, and municipalities."

#### KNIGHT TELLS OF SOIL LOSSES BY EROSION

Dr. Henry G. Knight, chief of the Bureau of Chemistry and Soils of the U. S. Department of Agriculture, spoke on soil conservation as a major problem in agricultural readjustment, and pointed to soil erosion as an important cause of recent readjustments in agriculture.

Of our heritage of something over 650 million acres of more or less readily arable land, at least 21 million acres have gone out of cultivation because of destructive erosion alone. What it took nature 3,000 years to produce, man is now destroying in the short period of one generation.

The area of land eroded in the United States, Doctor Knight said, already exceeds the total area of arable land in Japan. On the Piedmont Plateau, an area of 51 million acres, about 2,600,000 acres once in cultivation has been destroyed

by gullying. From 4 to 18 inches of top soil have been washed from about 65 per cent of the cultivated portion of the entire Piedmont Plateau. In the Appalachian Mountain area, comprising 78 million acres, between 10 and 15 million acres have been seriously eroded. The southern brown loam region, comprising 17 million acres of once very fertile land in Mississippi, Tennessee, Kentucky, Arkansas, and Missouri, has lost most of the top soil from about 8 million acres and probably 3 million acres have been permanently ruined by gullying. In the rich Black Belt of Texas, Alabama, and Mississippi, erosion has been severe over 4,500,000 of the 12,000,000 acres. Of the 36 million acres of the red plains of Texas, Oklahoma, and Kansas, 8 million acres have been severely eroded and about 1,200,000 acres have been utterly ruined by erosion.

The Department of Agriculture is attempting to meet the erosion problem, Doctor Knight explained, by developing practical methods the farmer may use in checking and controlling erosion. Nine regional erosion experiment stations have been established in the past two years, and ten more are ultimately to be established in the major regions where soil-washing is a serious problem.

The decreased acre yields of wheat in parts of the Wheat Belt, the decreased acre yields of corn in many sections of the Corn Belt, and the decreased acre yields of cotton in numerous localities in the Cotton Belt can in large part be attributed to soil washing, Doctor Knight believes.

Stressing the need for classification of our land resources by means of soil maps—already available for most of the farm lands of the country—by topographic maps, and economic surveys, Doctor Knight suggested the four groupings into which all agricultural lands might fall. The first group would include non-arable



lands, lands too steep, too stony, too wet, or too gullied to plow. The second group might include marginal lands, those too poor and droughty, too arid, too difficult to plow, or too much subject to intermittent wet and dry spells. The third group would include lands hazardous from the standpoint of erosion, while in the fourth group would go the lands satisfactory for general agricultural purposes.

"The lands of the first three groups would be protected by throwing them into forests, grazing lands, wild life refuges, hunting preserves, and areas for recreation," said Doctor Knight, "leaving lands in Group 4 upon which to expend our best efforts in the formulation of a land utilization program."

"The time is ripe," Doctor Knight concluded, "for developing a conservative, sound, and satisfactory policy for conservation of our soil resources. Any plan of agricultural readjustment should have this as a prime consideration. Our millions of acres which are not actually needed for production at the present time should be carefully conserved for future use, and the acres which are needed should be protected from needless destruction."



#### MEMORIAL DEDICATED ON NATIONAL FOREST TO ROOSEVELT THE CONSERVATIONIST<sup>1</sup>

PINCHOT EULOGIZES ROOSEVELT

The letter which follows was sent by Governor Gifford Pinchot of Pennsylvania, to Mr. Evan W. Kelley, Regional Forester, U. S. Forest Service, Missoula, Mont., and was read at the dedication of the Roosevelt Memorial at Marias Pass, Mont., October 25, 1931.

"I would give almost anything I have

to be with you today. To be with you among those mountains, whose peaks I have climbed; over so many miles of which, with my old friend Jack Monroe, I have carried my pack; in whose valleys I first learned, from Billy Jackson, one of Custer's Scouts, to throw the diamond hitch; and in whose forests, and above them, I killed deer and bear, and elk and goat and mountain sheep. This region holds some of the pleasantest memories of my life.

"In view of why you are here, nothing else could keep me away, nothing less could detain me, than the great and difficult task of keeping nearly a million Pennsylvania unemployed, with their families, from the worst of the misery that threatens them during the coming winter. That is my justification, and it is complete.

"Theodore Roosevelt was my leader and my friend. He has taken the long, long trail. He has faded from my sight. But his spirit has not faded.

"I can still hear him declaring that the public good comes first. I can still hear him asserting that the forest and water problems are the most important internal problems of the United States. I can still catch the echo of his statement that 'it is better to help a small man make a living than to assist a rich man to grow richer still.' I can still feel his hand on my shoulder as I did when the Forest Service began the first effective regulation of electric utilities in the history of the United States.

"I can still thrill to the joy of battle in his eye when he went forward to meet, more than half way, the attacks of the enemies of the people. And I doubt if any other monument that can ever be erected to him would please him more than this, set in the land he loved so

<sup>1</sup>Further notes on the memorial appear in the Nov. 16, 1931, issue of the U. S. Forest Service *Service Bulletin*, the entire number of which is devoted to the subject. *Ed.*

well and dedicated to a cause that was nearest his great heart.

"But of far more consequence than any personal friendship whatever is the fact that Theodore Roosevelt, who embodied, as few other men have ever done, the spirit of East and West in the highest form of both, was the friend of conservation and forestry. Under him the United States Forest Service grew to be the undefeated champion of the rights of the people. While he lived, no man, no interest, no politician, and no combination of them could make it afraid.

"Those were glorious days. In them Theodore Roosevelt gave us most of the national forests. He not only created them, but he defended them. When the sheep men, now their friends, attacked them, he stood like a rock. When the mining men, the lumbermen, struck, he caught and stopped the blow. When they mobilized all the resources of venal politics against the national forests, his shield blunted their arrow.

"Neither forestry, nor conservation, nor any question of the public's rights was remote enough to be passed by. When the crooked special interests who preyed upon the people advanced their pleas, he knew the field, he knew the facts, and he met and defeated them. His record then is the proof of where he would have stood today.

"Those, I repeat, were glorious days. In them the Forest Service, to which I had the great honor to belong, was facing a hostile world. Public opinion in the West was mainly against forestry. The Forest Service, and the conservation of natural resources. It was Theodore Roosevelt's support that brought us through.

"The fight for forestry in those days was a clean-strain fight, and because it was clean strain it won a notable victory. But great as were those days, the greatest days of forestry in America are still

ahead. The greatest task is yet to be performed. The greatest victory is yet to be won.

"That task is the saving of the three quarters of our forests that are in private hands, whose destruction goes on unchecked.

"That victory is the rescue of forestry from the leadership of commercial interests whose chief purpose is to see that forestry fails, that it is never really applied to the lands they own.

"Who can doubt where Theodore Roosevelt, the greatest friend forestry in America ever had, the establisher of conservation on this continent, would have stood in this vast conflict? His word to the foresters of America in substance would have been this:

"Choose ye this day whom ye will serve."

"Choose between the forests and their devastation. Choose between the people, to whom God gave this continent, and those interests whose enormous concentrations of resources, of money, and of political power, have already checked, and now threaten to destroy, the essence of liberty in America.

"As for me and my house, we stand for the forests, for Theodore Roosevelt, and the people.

"Let us never forget this tremendous saying of the leader we commemorate today:

"It is of little use for us to pay lip loyalty to the mighty men of the past unless we sincerely endeavor to apply to the problem of the present precisely the qualities which in other crises enabled the men of that day to meet those crises."

#### SHERMAN ACCEPTS CUSTODIANSHIP OF MEMORIAL FOR FOREST SERVICE

"The Forest Service accepts the custodianship of this monument. We shall revere and protect it as the sacred shrine

of conservation. In the absence of Chief Forester R. Y. Stuart, it is my good fortune to speak the official words accepting responsibility for its preservation from all but the consuming force of time.

"The time, the place, the occasion mark this as an act of historic significance. Our promise takes a tone of solemnity because of the sacredness of the cause which this obelisk commemorates.

"In Theodore Roosevelt conservation found its greatest champion. Whatever is admirable in our national Forest Service we owe to him and the leaders he gave to us. There were united in his soul the finest of the East and the truest of the West. His career and personality had this in common with the great highway which this monument adorns. He linked the East with the West. As this great thoroughfare breaks through Marias Pass, so did his instant and complete understanding break through every restraint or prejudice of provincialism. He was the ideal outdoor man. Above all other statesmen of his age, he understood the language of forest and plain, river and mountain, the cone in his house of rocks and the waterfowl winging its distant flight. He saw not alone the beauty and mystery of nature but appreciated as well the potential value of forest-clad hills, tumbling streams and arid plains. He lived his own day with busy hands and throbbing heart, yet he saw far into the future, anticipated the needs of those who follow in our footsteps and with calm courage and so far as laid within his power, made provision for those needs.

"Washington fought for the independence of man in 1776; Lincoln labored for the union cause of '61; Roosevelt sought economic justice and opportunity, not for his own generation alone, but equal justice for the generations which

are to follow. Like Washington and Lincoln, he grows in moral stature and historical importance with the passing of time. Instead of fading into the distance, his dynamic character is more clearly and sharply outlined.

"The Forest Service gladly accepts this custodianship. We, too, are of both the East and West. Today, standing on this great continental divide, we rejoice that Theodore Roosevelt was our great leader. It was his signature that brought the Forest Service into existence. His signature added 120,000,000 acres to our national forests and dedicated them to the service of all the people. Take from our national forests today the reservations made by Theodore Roosevelt; balanced against them all the lands added by other chief executives before his day and since, and his contributions outweigh them all. What wonder that such men as Pinchot, Graves, Greeley, and Stuart have carried on with loyalty in their hearts and always a smile of contentment on their lips, born of a noble cause.

"We rejoice in his memory. We rejoice that this memorial was born of the inspiration of a former member of the Forest Service, Hon. Scott Leavitt, congressman from Montana. To him, as to each of us, his Forest Service badge and shield, emblem of public service, is as simple American equivalent of the Victorian cross.

"In the name of the Forest Service, and pledging its support to the principles of human justice which inspired the cause of conservation, this memorial is accepted, to be held in trust for the people of the United States, generation by generation."

#### LEAVITT GIVES SIGNIFICANCE OF MEMORIAL

The purpose for which this monument is erected by the Congress of the United States to Theodore Roosevelt for his



leadership in forest conservation may be stated in a few words. The first day of February, 1930, marked the twenty-fifth anniversary of the organizing of the present Forest Service. Theodore Roosevelt was, at that time, in 1905, President of the United States and it was because of his interest in the conservation of the national forests that this reorganization was possible, and it is in turn due to that reorganization that forest conservation came to assume its place of great importance in the life of the nation. So clearly did President Roosevelt see the necessity of a well-founded forest policy that he remarked on one occasion that the conservation of its forests constituted in many ways the most important internal problem of the United States.

Observance of the twenty-fifth anniversary of the birth of the present Forest Service was had in Washington. On that occasion it was my privilege to address the House of Representatives on the significance of the day, and to state that I would introduce a bill to make permanent the tribute of a grateful country to Roosevelt, the conservationist. I introduced such a bill, and it finally passed in a form which has provided this magnificent monument, erected here on the continental divide and on the boundary line between two of the greatest national forests. What I had in mind was expressed on that occasion to the effect that posterity, witnessing the resulting benefits of Roosevelt's wisdom and courage, would say that no greater evidence exists of his statesmanship than his essential contribution to a national policy of forest conservation. His leadership was not only evident and necessary at the seat of government, but it was also potent in creating throughout the land that understanding and active public sentiment required to advance such a great idea into the position of a permanent national policy and to a program of achievement. His voice reached the ears of the people, and

theories which had been entertained by the few became the established conviction of the many.

Among the decisive steps which he took, one arose out of the situation in 1907, when there was written into an appropriation bill by opponents of conservation a provision that the President should no longer have authority to create national forests by his own proclamation, within the boundaries of five of the western states. When this matter was brought to his attention, with characteristic decision and energy, Roosevelt called for the preparation of proclamations to add an additional 17,000,000 acres at once to the national forest areas. He signed those proclamations first, and then signed the bill containing the provision which deprived him of such power. He realized that the future judgment of the nation would be behind the preservation of the great forested areas of the mountains, not only as reservoirs of a timber supply for the nation, but also for the protection of the headwaters of the streams to give life and permanence to great agricultural areas, to assist in the control of floods, and to provide a measure of stabilization to the flow of navigable waters. He knew the West and the great mountain areas, and he likewise knew the problems of stream flow, forestry needs, and the necessity for recreational areas within the congested sections of the East. His was a national vision, coupled with courage and initiative, out of which sprang accomplishment. In my judgment, let me repeat, the generations of the future will say that no greater permanent contribution to the welfare of the nation exists within the entire scope of the tremendous and varied activities of this truly great American than his leadership to make permanent as a national policy the conservation of our forests.

The location of this monument on the continental divide and on the boundary line between the Lewis and Clark and the

Flathead national forests has a special significance. It stands in the center of a highway dedicated to this great leader. It stands in the center of that highway, so that it will stand in the view of the thousands following this way to the West. It stands at what may well be considered the gateway to the great region of national forests, into which the traveler will go as he passes this way. It will serve to implant in the minds of those who come here the purposes and the need of the care of our forests. They will travel on with minds turned toward their own duty to assist in the preservation of that heritage which leaders such as Theodore Roosevelt and those who labored with him thus preserved for the generations to come. It will arise here, a memorial to great public service. It will arouse the desire of those who witness it to emulate in their own way those qualities of good citizenship which include an essential contribution to the general welfare.

Its location has likewise a touch of sentiment so far as I am personally concerned. I wrote this location definitely into the law in order that no question might arise as to the spot upon which this obelisk should be erected. It so happens that the Lewis and Clark National Forest was the first over which I had supervision as a Forest Supervisor. I came to this area as the Supervisor of the Lewis and Clark National Forest twenty-one years ago. But beyond that consideration of personal sentiment there is the fitness of the location within itself as the site of such a memorial. The crest of the mountains; the pass through which the millions will forever go on their ways East and West; the magnificent setting of the peaks which are a symbol of the rugged and upstanding character of the American whose service is thus commemorated; all these contribute to the essential fitness of the place which has been chosen. This great obelisk will

stand here like a finger pointing upward as an incentive to service.

The honor I have of now placing in the keeping of the United States Forest Service on behalf of the Congress of the United States is a most signal one.



#### ADVISORY GROUP CONSIDERS RECOMMENDATIONS FOR STABILIZATION OF FOREST INDUSTRIES

Definite recommendations for the stabilization of economic conditions in the country's forest industries through cooperative public and private action were included in three important subcommittee reports presented to members of the advisory committee of the United States Timber Conservation Board in meetings at Washington, November 16-17.

The recommendations represented the findings of subcommittees on "Publicly Owned Timber," "Sustained Forest Yield," and "Forest Taxation." The respective reports dealt with (1) the acquisition, sale and cutting of publicly owned timber, (2) means of promoting economic perpetuation of the forests and forest industries through sustained yield forest management, and (3) federal and state tax laws in relation to timber growing and conservation.

The advisory subcommittees' reports will be taken under advisement by members of the Timber Conservation Board at a specially called meeting in Washington on November 25, according to Ripley Bowman, secretary of the board. These findings will be used in drawing up the board's recommended program of public and private action to establish and maintain an economic balance between production and consumption of forest products and a unified plan of forest conservation, it was said.

Dr. Henry S. Graves, dean of the

school of Forestry, Yale University, as chairman of the subcommittee on publicly owned timber, discussed policies concerning the administration of commercial timber under government control. He stated proposed changes in methods of administering revenues from national forests, and also upon policies governing the acquisition of timber, its cutting and sale, which were made a part of his subcommittee's report to the board.

Major David T. Mason, manager of the Western Pine Association, Portland, Oregon, chairman of the sustained forest field subcommittee, outlined suggested means of assuring perpetuation of the nation's forest resources. The economic possibilities of growing trees on a crop basis were cited in the sustained yield report.

A discussion of federal and state tax laws and policies as they affect the growing of timber on a commercial basis was presented by Dr. Fred Rogers Fairchild, chairman of the Forest Taxation Inquiry of the U. S. Forest Service. Dr. Fairchild is also chairman of the Timber Conservation Board's advisory group subcommittee on taxation, and presented the findings of this body.

The recommendations of the various subcommittees were reported after more than a year's study of the respective subjects. There are several other important subcommittees whose reports will be submitted later.

Major R. Y. Stuart, chief forester, U. S. Forest Service, is chairman of the board's advisory committee. Its membership is made up of representatives of the forest industries, professional foresters, both in and out of the government, prominent conservationists, and private and government economic experts.

Members of the committee who attended were: R. Y. Stuart, chairman; Hugh P. Baker, Ovid Butler, S. T. Dana, Frederick M. Feiker, Henry S. Graves, George N. Ostrander, Charles J. Rhoads,

J. W. Watzek, Jr., E. T. Allen, Laird Bell, Wilson Compton, Fred R. Fairchild, Tom Gill, David T. Mason, Axel H. Oxholm, George W. Sisson, Jr., and C. R. White. Others present were: Julian McGowin, W. T. Smith Lumber Company, Chapman, Alabama; L. H. Peebles, Chief, Lumber Division, Department of Commerce; Franklin Reed, Executive Secretary, Society of American Foresters; Paul G. Redington, Chief, Biological Survey; L. D. Arnold, Assistant to Director of Forestry, U. S. Indian Service; M. W. Kriegh, Executive Assistant, Timber Conservation Board; R. E. Marsh, U. S. Forest Service; J. P. Kinney, Director of Forestry, U. S. Indian Service; and Ripley Bowman, Secretary, Timber Conservation Board.



#### REDUCTION IN GRAZING FEES DENIED

A recent bulletin of the American Forestry Association, released through the Forester's office, reads in part:

"A request from the American Wool Growers' Association for a reduction in grazing fees on national forests has recently been disapproved by the Secretary of Agriculture on the grounds that the fees constitute a small part of the costs of producing livestock; that the advantages to holders of forest permits are recognized and in demand; that any reduction in income to the forests would be reflected in reduced income for schools and roads in the forest counties; and the reduction would hamper improvement and protection of the forests. This situation may again bring the grazing issue into Congress."



#### PLAN OUTLINED FOR ECONOMIC STUDY OF NAVAL STORES INDUSTRY

A program for stabilizing economic conditions in the naval stores industry of



the southeastern section of the United States by means of private and governmental coöperation was tentatively drafted at a meeting between representatives of the industry and members of the U. S. Timber Conservation Board at the Department of Commerce on November 10. This meeting was the result of recommendations by Franklin Reed, Executive Secretary of the Society of American Foresters, that the Board should include within its field of inquiry the naval stores industry and its problems as intimately affecting forest stability in the southeast.

A greatly unbalanced ratio between production and consumption, tax rates versus returns from standing timber, and disorganized marketing methods, were defined by the industry's representatives as the three major factors adversely affecting its stability and calling for immediate attention. In keeping with its purpose to develop remedial recommendations for the stabilization of the forest products industries as a whole, it was proposed that the Timber Conservation Board appoint a special committee to survey the naval stores industry.

The naval stores committee, as proposed, would be charged with the responsibility of studying conditions as outlined and with making recommendations for public and private action to rectify them. The actual appointment of the committee will depend on whether or not the industry itself feels such action is desirable, according to Ripley Bowman, Secretary of the Timber Conservation Board.

Under the plan as discussed at the meeting the naval stores committee, coöperating with the Timber Conservation Board, would concern itself mainly with the production and consumption ratio, and the timber land tax situation. The industry will be responsible for developing more orderly marketing methods according to Mr. Bowman.

The Timber Conservation Board already has made studies in the lumber industry as a part of its program to establish and maintain an economic balance between production and consumption of forest products, and to develop a deliberate plan of forest conservation. Similar surveys, to be made by the Board, have been requested by the pulp and paper industry.

The naval stores industry was cited by those present at the Board's hearing as the economic key to successful reforestation of southern yellow pine timber lands in the southeastern states. It is only by the growing of trees suitable to the production of turpentine and rosin that the vast acreage of idle lands in this section can be made to return an income, it was said.

Naval stores producers, factors, distributors, professional foresters, private and government economic experts, timberland owners, and representatives of the forest conservation movement attended the hearing.



#### WATER POWER VALUES ON NATIONAL FORESTS TO BE STUDIED

Classification and study of all lands in the national forests having water power values is scheduled for the near future by T. W. Norcross, chief engineer of the Forest Service.

It has been estimated that the national forests include one-fourth of the power resources of the United States, Mr. Norcross reports, but this estimate may be somewhat in error because of lack of basic information on streamflow, head, and other pertinent factors. Under a plan approved by the chief forester, the Forest Service will first undertake to determine the location and power capacity of national forest lands having power values.

available statistical information will be assembled and converted to terms of international rating standards. The plan also provides for a review and study of land now under power classification and withdrawn for power development.

Through this study the Forest Service hopes to provide a basis for long-term planning of the handling of land having water power potentialities and to permit rational forest administration which will assure utilization of the lands for their highest public values, according to Mr. Forcross. Water power is only one of the National Forest resources, and where use of lands for power development conflicts with development of roads, railroads, recreation, logging, or other uses, it is essential to consider possible adjustments looking to utilization for more than one purpose and to maximum return from the forest resources.

No expansion in personnel is contemplated by the Forest Service for this study and the work will be done by Federal officers in connection with other field activities.



#### MEETING OF THE U. S. TIMBER CONSERVATION BOARD

The Timber Conservation Board met November 25, to consider reports and recommendations from certain of its advisory subcommittees as presented and discussed by the advisory committee at its meeting on November 16. The Board accepted and acted on the reports of the advisory subcommittee on "Publicly Owned Timber," of which Dr. Henry S. Graves is chairman. The reports of the committee on "Sustained Forest Yield," David T. Mason, chairman, was taken under consideration, while the report of the committee on "Forest Taxation," Dr. Fred R. Fairchild, chairman, was referred

back to the advisory committee for further study. As received by the Board, the report on "Forest Taxation" contained no recommendations.

The Board approved the continuance of the work of the "Special Lumber Survey committee" and also authorized the appointment of similar committees for surveys of other of the forest products industries, if such work could be financed.

The Board outlined specific investigations along six important lines which it requested its advisory committee to pursue, as follows:

1. That the advisory committee be requested to make an investigation and, if possible by May 1, a report on:
  - a. The probable effects and the practicability in the principal timber states of the substitution of an optional yield on mature standing timber.
  - b. The character and extent if any of financial accommodation probably necessary in each such state to meet current fiscal needs.
2. That the advisory committee be requested to make an investigation and a report if possible by May 1, of the probable effects and the feasibility of a permanent general policy, for the disposal and use of publicly owned timber, based on the following controlling objectives:
  - a. Primary objective—maintenance of timber reserves to be cut only to meet public needs.
  - b. Secondary objective—to promote permanent operations on both public and private forest lands.
3. That the advisory committee be requested to make an investigation and a report if possible by March 1, of
  1. The probable effects on
    - a. Overproduction of forest products.
    - b. Stability of private timber ownership.

c. Security of employments in the forest industries.

d. Permanent timber supply.

e. Administration of National Forests, of extensive reacquisition of surplus timber reserves in the West and extensive acquisition of cut-over and reforesting lands in the South and North;

2. The probable extent of such acquisition, by

a. Purchase, or

b. Donation with or without reserved cutting, or purchase rights, or

c. Exchange, necessary to establish stable conditions of forest ownership and conservative timber utilization.

3. The probable financial feasibility of such acquisition, including possibilities of financing, under provisions of which the receipts from National Forests may be expected ultimately to pay the entire cost, involving no net burden upon federal revenues from taxation.

4. That the advisory committee be requested to investigate and, by May 1, to make a report on the:

a. Probable effects,

b. Practicability, and

c. Desirability

as an aid to remedying the causes and consequences of overproduction in the forest industries, of a system of state compacts for purposes of timber conservation and control of timber cutting, under authority of federal law or otherwise; including the establishment and enforcement of state production quotas.

5. The advisory committee is requested to make an investigation and not later than May 1 a report on the probable effects, advantages and disadvantages, and feasibility of federal regulation, comparable in purpose to that under the present so-called "pure-food" laws, which would require shipments of lumber and timbers in interstate commerce to be graded and identified in accordance with publicly

recognized standards of grading and inspection.

6. The advisory committee is requested to investigate the merits of the continuation in some form of the collective means, initiated through the Timber Conservation Board, of public and private coöperation for (a) timber conservation, (b) stabilization of forest industry and (c) security of employment therein, including the practicability of unified national representation of the primary forest products industries, and of the forest conservation groups; and, not later than May 1, 1932, to make accordingly a suitable report with recommendations.

FRANKLIN W. REED,  
*Executive Secretary.*



## FINANCIAL ASPECTS OF FORESTRY

A study of the financial aspects of forestry was begun in 1929 by the Southern Forest Experiment Station to provide information as to the trends of lumber values, costs of timber growing, returns from forestry, and other controlling factors which will serve as a sound basis for the practice of forestry under the specific conditions found in the southern United States.

One of the initial phases of the project has been the conduct of studies of selected sample counties to determine the timber-growing possibilities on small forest properties such as are found in timberlands owned by farmers and other owners of small areas, which in the aggregate make up a very large proportion of southern pine lands. A number of such county studies have been made and others are contemplated. The typical counties which have been investigated and for which reports have been completed or are now in process of preparation are the following: Alcorn County,



Mississippi, typical of the shortleaf pine timber type which is being cut out rapidly by small mills; Appling County, Georgia, typical of small naval stores operations in the longleaf and slash pine region of southeastern Georgia; Lee County, Alabama, typical of the small lumbering operations in the mixed pine region in east central Alabama; Hempstead County, Arkansas, typical of the shortleaf-loblolly pine district in southwestern Arkansas; Beaufort County, North Carolina, in loblolly territory, with moderately large mills; and five counties in Florida, Washington and Bay Counties in west Florida, Hamilton County in north Florida, Bradford County in northeast Florida, and Osceola County in the southern part of the State. Each of these Florida counties is typical of the longleaf or longleaf-slash regions which are being worked extensively for naval stores products, although pulpwood, ties, poles, staves, and lumber also come into the picture.

The financial aspects studies include:

1. A determination of stumpage "realization values" (residual stumpage plus profit, after manufacturing costs, including interest on capital, are deducted from sale values) and "appraised stumpage values," which are realization values less 12 to 15 per cent allowance for profit and risk margin.

2. The above figures, coupled with actual growth, give the net stumpage income per acre from pine lands stocked with different species of southern pines in average and optimum condition.

3. Study of taxes and other costs, together with land values to determine under what conditions the net stumpage incomes in (2) are now or promise to be a satisfactory return on the investment.

Conditions found in some of the county studies where emphasis was placed on the farm and smaller timber land holdings are, briefly, as follows:

*Beaufort County, North Carolina.*—An example of present under-utilization.

*Species.*—Loblolly Pine, utilized for general lumber by small portable and medium large mills (50,000 to 75,000 feet cut per day). The present annual cut averages 208 board feet per acre for the county, with a gross value f.o.b. county of \$4.43 in forest products. Annual growth is placed at 347 board feet, valued at \$1.75 per acre (appraised value). Hence the county is increasing its growing stock. The 1929 "realization value" (stumpage plus margin for profit and risk; interest is deducted as a cost) was about \$6.25 per thousand feet. International log scale ( $\frac{1}{4}$ " kerf); appraised value \$5.05; and mean market value \$4.32. The average stand for the county runs 3,675 board feet per acre. The increment shows a potential income of 4.6 per cent on a capitalization of \$10 per acre for land and growing stock below 9 inches, and 3,675 feet in trees 10 inches d.b.h. and up. Expenses are: taxes, \$0.37, protection and administration, \$0.07. Taxes take, therefore, 26 per cent of the net increment before taxes are deducted.

Average well-stocked stands show an increment of 400 board feet per acre when selectively cut, which is equivalent to a return of 4.8 per cent on \$10 land and young stock, and 4,500 feet of growing stock 10 inches and over at \$5.05 appraised value; annual expenses are: \$0.46 per acre, of which \$0.39 is tax. Net returns are \$1.56 per acre after deducting tax and protection and administration expenses.

The best sites showed an annual increment of 633 board feet per acre, with a mean growing stock of 6,665 board feet 10 inches and over and a \$15 land value with a good assortment of smaller sizes. Net return was \$2.68 per acre, or 5.5 per cent after deducting taxes of \$0.45 and

protection and administration of \$0.07 (figured on appraised value).

The good showing of this county is due to the fact that second-growth is just coming into merchantability. As cutting increases, fire protection must improve to secure more seedlings if these selectively-cut stands are to be stabilized.

*Lee County, Alabama.*—An example of over-utilization.

*Species.*—Loblolly and short leaf pine. Land consists largely of small woodland, farmer-owned. The average annual increment for the county is 135 board feet per acre. The cut by "roofer" organizations, portable mill and central planer in 1929 was 368 board feet per acre, showing a heavy over-cut. The cut totaled \$7.77 gross per acre of county forest but is falling rapidly due to the exhaustion of the growing stock. The effect of excessive fire is shown by the relatively low increment. Realization value for roofer stumpage was \$6.38 (International  $\frac{1}{4}$ " kerf rule); appraised value \$4.70; and average sale value is \$3.69 or \$3.97 mill run (International  $\frac{1}{4}$ " kerf rule was under-cut 7 per cent on mill test).

Including the uncut areas and young unmerchantable areas there is an average increment of 135 board feet worth about \$0.64 per acre, with land and growing stock put at \$12.00 (appraised value). Taxes are \$0.15 or about 24 per cent of the gross increment value. Assuming an annual cut, the income after deducting taxes is about 4 per cent.

Nine uncut stands studied in this county showed a current annual growth (10-year period) or 496 board feet per acre, worth \$2.33 (if cut annually), or about 5 per cent after deducting taxes (21 mills on 60 per cent of \$35.88 appraised value). Protection and administration costs were omitted on these farm lands.

*Appling County, Georgia.*

*Species.*—Second-growth slash and long-leaf pines. Principal utilization is for

naval stores production; a small amount of lumber, staves, etc., are cut. The gross income in 1929 was \$4.90 and net income \$1.12 from all forest land. The net income from all pine land is \$1.03 per acre, of which \$0.78 is for naval stores. Taxes are \$0.16 per acre, or 16 per cent of net (protection is an operating cost). The 1929 realization value per cup for naval stores was 3.79 cents; market value was 3.75 cents. For 1921-29 average prices the realization value for the average 35-unit crop was 7.65 cents per cup with an appraised value (12-cent profit allowed) of 5.35 per cup.

The cut and net growth of pine balance at 9 million feet. This is an annual growth of 54 board feet per acre, low because of poor stocking (0.22 normal); an annual mortality of 2.5 per cent with a butt cull of 30 per cent for the small timber. In the next 12 years, it is estimated that the naval stores production will decrease 50 per cent for lack of sufficient young round timber, so that for this industry the income will decrease for about 12 years and then begin to increase again.

Optimum stands show a possible stabilization of naval stores stands at 100 cups per acre, or an annual naval stores income of \$5.35 (appraised values on 1921-29 prices) per acre. Residual timber values should bring this up to \$6.00. At 1929 prices for cup rentals, this figure would be \$3.75, with residual timber bringing it up to \$4.40 or better.

Present forest land and growing stock partly depleted by cupping sells for \$6.66 to \$15.00 per acre. There is thus seen to be a large margin of income to care for the increased costs which accompany the best forest management.

*Washington County, Florida,* showed less satisfactory present forest stand and income from naval stores timber, with higher taxes (\$0.25 per acre). Tax studies in Florida show taxes of from \$0.09 to \$0.55 per acre in different coun-

es. A remedy is now being sought for this situation.

Taxes in Georgia and Alabama on second-growth pine land generally appear more reasonable than in Florida.

*Alcorn County, Mississippi*, like *Lee County, Alabama*, showed a rapid decrease in the amount of growing stock on its shortleaf pine stands and low average increment, but the income from well-stocked and protected stands was satisfactory.

*Hempstead County, Arkansas*, with mixed loblolly and shortleaf forest, showed a balanced growth and cutting was taking place at the rate of about 300 board feet per acre annually.

In general, except for some of the Florida counties and others that may have excessive taxation, studies thus far indicate that the southern pine lands that are failing to earn a fair return on their cost value are always very deficient in a stand of growing trees, generally caused by fire and earlier logging methods. Getting a proper stand of trees is the keynote to financial success in growing southern pines. Present prices (not 1930 depression prices) permit a fair return already. A study of price trends is indicating better second-growth pine values for the future.

Other counties in typical forest regions in the South will be investigated during the coming year. It is anticipated that a number of these county reports will be published by coöperative agencies. Much assistance has already been obtained from state officials and private land owners in each of the counties studied.

Another important phase of the Financial Aspects Study will be the case studies of large lumber companies to determine the possibilities of timber-growing by large commercial operations in the South. This work has not yet gotten un-

der way, but will be begun during the fiscal year 1931.

From TENTH ANNUAL REPORT,  
*Southern Forest Experiment Station.*



### WHAT IS TREE SURGERY?<sup>1</sup>

I have been made to understand that the science of tree surgery is not considered a branch of forestry. In fact several renowned foresters have told me that I am prostituting my profession and that I have a nerve to call myself a forester. I will admit that such should be the case for men with M. F. degrees who are engaged in banking, chicken raising or what not.

The question then arises "what is a tree surgeon?" The name is a misnomer. We should be called arborists. Our work is the care and preservation of shade trees from an aesthetic viewpoint. Our most important lines of work in the approximate order of importance are: Trimming and pruning, feeding and root treatment, spraying and insect control, moving big trees, tree surgery (cavity work, bracing and cabling), taking down trees, thinning, improvement cuttings, wire clearance, orchard work, reforestation and tree surveys.

Almost daily I have to call on my forestry education covering the following subjects: Dendrology, entomology, silviculture, planting, mechanics and engineering. And yet I am not called a forester. Who of you dyed-in-the-wool foresters uses his forestry education more? I make more practical use of my education now than when I was in the august Forest Service.

Our profession is the answer to the gradually increasing demand for the care of shade trees. This demand was caused

<sup>1</sup>Presented before the Ohio Valley Section of the Society of American Foresters, Louisville, Ky., October 29, 1931.



by the property owners' growing appreciation of the aesthetic value of shade trees.

Many individual shade trees have a larger money value than the best acre of timber in the country. If it were possible to compile the aesthetic value of the shade trees of the country, the resulting figure would amaze you. The value of such trees in the Cleveland territory would run into many *millions*.

Altogether we care for over a billion dollars' worth of trees yet we are not foresters. Your tree owners get their results in money from harvested crops. Our owners get their's from the increased aesthetic value of their trees. When a nation loses its appreciation of the aesthetic that nation will be doomed. We feel that our profession, in that it is constantly striving for increased value of beauty, is doing a real piece of work.

The fact that we are not organized depreciates not at all the value of our work. There are hundreds of tree surgery companies scattered from coast to coast and from Canada to the Gulf. They are all striving toward the same goal. Most of their men are skilled in some or all of the lines of work mentioned above. Many have different ways of attaining the same results. No one can yet say which is the better method. We are still pioneering.

ABBOTT B. SILVA,  
*Pres. The Silva-Pfeifer Co.,*  
*Cleveland, Ohio.*



#### EARLIEST FOREST SCHOOLS

A school of forestry was founded in 1766 by one Zanthier, who is said to have been the first systematic teacher of forest science and who taught at Ilsenberg, a town in Upper Saxony not far from the Harz Mountains. Another was

started by Langen in Wernigerode in 1772, followed by the establishment of a forest school in Hungen by G. Hartig in 1791. But it is the name of Heinrich Von Cotta which has been most extensively associated with the founding of the advanced schools of forestry, as we think of them in the present day. Most of the early forest schools appear to have been more of the type of private centres of instruction, which died out with their founders.

Cotta, who spent a number of years placing the forest of Fishbach in orderly condition, gave theoretical and practical instruction to the young men who assisted him there. Thus a new centre of forest instruction was established at Zillbach and such was the reputation acquired by Cotta's school that in 1795 it was granted aid by the state. When, in 1810, he became director of forest management in Saxony, he succeeded in having the school at Zillbach transferred to Tharandt in 1811. Later, in 1816, the school at Tharandt became a government academy and from that time it flourished and attracted to it students from many different countries. Thus arose from a very modest and humble beginning what has frequently been called the most influential forest school in the world.

HENRY E. CLEPPER,  
*Pennsylvania Department of*  
*Forests and Waters.*



#### GAME SYSTEM DEPLORED AS "MELTING POT"

"A melting pot that has failed its work," is the way Aldo Leopold, wildlife investigator of the Sporting Arms and Ammunition Manufacturers' Institute, a senior member of the Society and author of the *Game Survey of the North Central States*, recently described modern game

propagation, in a statement made public by the American Game Association. Mr. Leopold has launched an intensive game survey in Iowa, with plans for the future as the objective. It will take him approximately a year.

Mr. Leopold believes that game restoration agencies have relied too greatly upon the makeshift method of substituting foreign birds and species for native game, because of the ease with which these can be raised artificially or imported for restocking from year to year.

"Thoughtless importation of Mexican quail, which diluted the hardy northern bobwhite blood in Massachusetts to an almost fatal point, is a constant threat against quail future in the rigorous climate to which native birds have become suited. Adding to game variety with the exotic pheasants and partridges is commendable and in many sections highly successful, but it must be remembered that native game is still the most popular, that it is truly adapted to its former ranges, that it is fast being forced out by neglect, and that game propagation by way of the incubator and the distributing truck every year is at least a stop-gap. Clean farming, which has almost spelled the doom of the quail and the prairie chicken by destroying wild-life cover and food, must be discouraged if game bird propagation is to be put on a practical basis."

Mr. Leopold sees in the farmer-sportsman coöperatives, being started by farmers in Indiana and other states to cultivate game for a profit from the sale of hunting privileges, as the most fundamental and promising conservation movement today.



#### ENGLISH SOCIETY CHANGES NAME

Word received from J. E. Davidson, Secretary, The Royal English Arboricul-

tural Society, London, gives the information that "His Majesty the King has sanctioned the change of this Society's name and all communications should, in future, be addressed to The Royal English Forestry Society." The Society's office is at Haydon Bridge, Northumberland, England.



#### OPPORTUNITIES FOR FORESTRY STUDY IN GERMANY

American foresters contemplating travel and study in Germany will find of interest a 15-page circular describing very briefly the facilities of German forest schools and German forests for theoretical and practical studies. The circular is distributed by the *Deutscher Forstverein*, and copies may be obtained from Dr. von Monroy Dessauer Strasse 26/III, Berlin.



#### REGISTER OF MEXICAN FOREST SPECIES

A paper published in *Mexico Forestal* of February, 1931, and prepared by Professor Guillerme Gandara for the First Mexico Forestry Congress, gives a list of the tree species, native and introduced, occurring in Mexico. The list is in two parts, the first giving the species found above an elevation of 1,700 meters, and the second those found at lower elevations. The order of presentation is alphabetical by local common names. The botanical name and family of each species is given, as well as a few brief and rather general notes on the character of the wood.

A. N. WEBER,

*Eldorado National Forest.*

## A NEW AID FOR HANGING CHARTS

Teachers and lecturers who have frequent use of charts before audiences usually have difficulty in hanging them. Either the wall material or the wood-work is too hard to receive thumb tacks or the owner of the lecture room prohibits their use. Suspending charts from picture mouldings is often awkward as is also the use of special standards. The writer has experienced this difficulty so frequently that he recently tried a new kind of adhesive tape for holding the charts to any surface. The tape used is supplied by Eugene Dietzgen and is known as Scotch Holdfast Drafting Tape, and sells for about \$1.50 for a roll of 72 yards. It resembles gummed wrapping tape but the adhesive is sticky without moistening. Two pieces, each about two inches long, can support as heavy charts as are generally used. The adhesive does not transfer its stickiness to the fingers nor the charts, in fact, when the chart is taken down the tape peels off readily without leaving a mark on the paper or the wall surface. Some heavy charts used by the writer have been placed on and removed from a blackboard surface several times yet the tape, left fastened to the charts, still retains its adhesive qualities.

The tape has also been tried for mounting herbarium specimens and was found quite satisfactory. It gives a firm hold at once but requires some skill in cutting it into strips.

EMANUEL FRITZ,  
*University of California.*

A CORE-EXTRACTING DRILL FOR  
CLOGGED INCREMENT BORERS

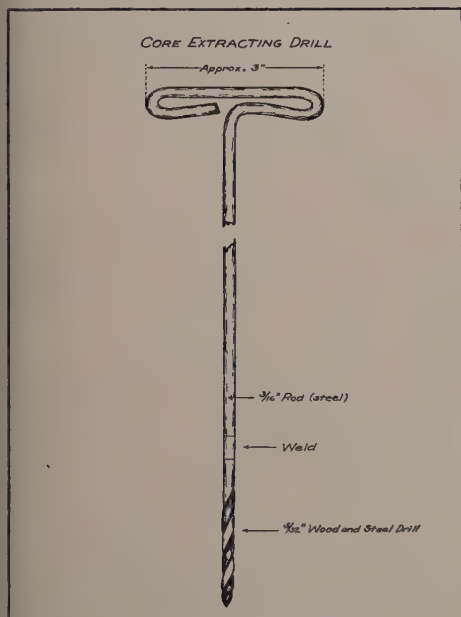
The clogging of an increment borer is of rather common occurrence when used in mixed hardwood and pine stands of the southeastern United States. There may be several reasons for this. In boring into the resinous pines, some of the resin adheres to the surface of the increment borer barrel. This can be offset somewhat by frequent cleaning and oiling. In boring hardwoods, the chief trouble comes when the borer penetrates into punky heartwood. It is sometimes difficult to remove the core with the spline when this occurs. However, when an auger, the barrel of which is lined with a coating of resin, is drilled into a punky hardwood, the punky material may become compacted and cemented in the barrel so that it is impossible to extract it by using the spline. Even frequent oiling of the increment borer barrel does not always prevent it from becoming clogged.

A new tool, in the form of a core-extracting drill, was recently devised to overcome this trouble. This tool proved its worth on a recent growth study in Arkansas, where the increment borer became clogged while boring into punky hardwoods. Several attempts at forcing out this material by boring into other trees failed. However, the punky material was quickly drilled out with the newly-improvised tool by inserting it into the handle end of the increment borer. Before this tool was devised, from two to three hours had been consumed in cleaning out the auger, using ordinary stiff



wire to break off pieces of clogged material.

This tool is of simple construction, and consists of a 5/32-inch wood and steel drill welded on a 3/16-inch steel rod. A T-shaped handle on the end of the rod completes the tool. Somewhat better results are obtained if the cutting edge of the drill is filed to a



sharper angle than is ordinarily found in wood and steel drills. The length of this tool should be about an inch longer than the increment borer. If a more portable drill is desired, a screw and socket joint, similar to that found on gun-cleaning rods, could be used instead of the solid steel rod.

C. F. OLSEN,

*Southern Forest Experiment Station.*



## TREES AND SHRUBS OF NEW HAMPSHIRE

The biennial report of the New Hampshire Forestry Commission for

the two fiscal years ending June 30, 1930, differs from its predecessors in that it has included with it a 131-page description of the trees and shrubs of New Hampshire prepared by John H. Foster, State Forester. The report itself is well up to the standard of the reports produced by New Hampshire's active Forestry Commission, but this particular one is doubly valuable because of the manual on trees and shrubs included with it. The manual is of a style similar to those produced by several other eastern states, and the illustrations are in large part from the same source.



## MICHIGAN STATE COLLEGE DEPARTMENT OF FORESTRY REORGANIZES

The forestry department of the Michigan State College, East Lansing, Mich., of which the late A. K. Chittenden was head from 1915 to 1930, as reorganized this summer has the following staff: Professor of forestry and head of the department, P. A. Herbert (Cornell, '21), formerly senior forest economist with the United States Forest Service; associate professor in charge of the utilization series, Harold S. Newins (Yale, '11), formerly associated with the Oregon Agricultural College, the Cutler Dry Kiln Co., and the Pennsylvania State College, and more recently State forester of West Virginia; assistant professor in charge of silvics and silviculture, R. H. Westveld (Yale, '25), on the staff since 1928 and formerly with the Pacific Northwest Forest Experiment Station; assistant professor in charge of dendrology and municipal forestry, Karl Dressel (Michigan State College, '22), on the

staff since 1926; in charge of mensuration and protection, A. B. Bowman (Pennsylvania State College, '22), formerly with the United States Forest Service in Montana and Idaho; in charge of the Dunbar Forest Experiment Station and Nursery at Sault Ste. Marie (since 1927), Putnam Robbins (Michigan State College, '27); extension forester (since 1924), Raymond Kroodsma (Yale, '16), formerly forester for the United States Military Academy. One position remains to be filled during this school year, that of assistant silviculturist to take charge of the college nursery, which has an annual output of more than 1,000,000 trees, engage in nursery research, and conduct the course in seeding and planting. The department is entering the new year with more complete equipment, better library facilities, and a larger operating budget.



#### FIRST PERMANENT SAMPLE PLOT ESTABLISHED IN MEXICO

For the first time in Mexico a permanent sample plot has been established. This plot is near the town of Madera, Chihuahua on land belonging to the Mexico North-Western Railway.

The plot embraces one hectare (2.47 acres), and is in the form of a square. It lies at an elevation of 6,994 feet above sea level. The soil is stony and the site is classified as Class II.

The plot contains 1,410 western yellow pine seedlings. In general, these seedlings are nine years old, as the stands were exploited by the Madera Co. Ltd. in 1922. Their average height is 6 feet, and their average diameter 3 inches at one foot above ground. The growth of the seedlings was measured with the Swedish increment borer, the height with a Biltmore stick and the diameters with a small caliper.

All the data obtained from this sam-

ple plot, will be compared with the data obtained in the western yellow pine stands of Arizona and New Mexico.

ADOLFO E. GALICIA,  
*Madera, Chihuahua, Mexico.*



#### WATER ABSORPTION CAPACITY OF FOREST SOILS

The study of Dr. J. T. Auten, of the Central States Forest Experiment Station, of forest litter and soil porosity has already resulted in some interesting observations upon the great water absorption capacity of forest soils as compared with the soils in open fields. He has found that, under undisturbed forest conditions, the mineral soils at one inch depth (beneath the duff layer) absorb water nearly fifty times as rapidly as do the agricultural soils in open fields; at three inches below the soil surface, the forest soil rate of absorption is seventeen times that of field soil's and at eight inches depth, it is two and a half times that of field soil's.

Field studies have indicated that the porosity of soils of second growth forest areas does not decrease greatly, provided that the forest cover is maintained and that grazing is not practiced to excess. Studies of soils in forest plantations indicate that a condition of porosity approaching natural forest conditions is regained after a period of twenty to twenty-five years. In nearby grazed woodland the porosity of the soils, and the capacity for water absorption, is little better than in open fields. The results already yielded by this study emphasize the importance of forest cover to the problems of flood control, soil erosion, and water conservation. The condition of the soil is also an important factor in the establishment and growth of forest plantations. A report on this study is now being prepared for publication.

# COOPERATIVE FUNDS BUDGETED TO COMBAT FOREST FIRES

Funds aggregating \$6,607,058 for preventing and suppressing forest fires have been made available for the fiscal year 1932 for the 38 states and territories cooperating with the Forest Service under the Clarke-McNary law, the Department of Agriculture announced recently. State, federal, and private funds make up the total, which shows a gain of \$412,878 over the last fiscal year, ending June 30, 1931.

The larger share of the state and private funds budgeted is for forest fire prevention. The grand total of state and private funds for both prevention and suppression for the year is set by the state budgets at \$5,034,520, against \$5,062,813 for the last year. State forest fire prevention budgets amount to \$3,000,660, and state suppression budgets to \$789,941. Funds from private sources total \$972,862 for prevention and \$271,057 for suppression. The coöperative federal allotment to the states amounts in all to \$1,572,538, which is \$46,986 more than last year.

A considerable proportion of federal, state, and private funds budgeted have already been expended since the beginning of the current fiscal year. Part of the money is used in the winter months in construction of firebreaks, forest trails, lookout towers, and telephone lines.

California's coöperative budget for forest fire protection is largest, with \$764,040 in combined state, federal, and private funds available. Other states with more than \$300,000 available from all sources are Michigan, Washington, Wisconsin, New York, Oregon, Minnesota,

Maine, Idaho, and Pennsylvania. Nevada and Hawaii joined the list of coöperators in fire protection for the first time this year.

Budgets of state and private forest fire prevention and suppression funds and federal allotments to the states for the fiscal year 1932 appear in Table 1.

TABLE 1  
FUNDS BUDGETED TO COMBAT FOREST FIRES IN 1932

	Total of state and private funds for prevention and suppression	Federal allotment
Me.	\$ 320,299	\$ 52,082
N. H.	56,675	17,322
Vt.	12,850	7,694
Mass.	139,000	32,440
R. I.	15,950	2,310
Conn.	72,120	13,218
N. Y.	347,103	72,421
N. J.	138,853	26,300
Pa.	268,006	51,934
Del.	24,080	1,318
Md.	73,688	11,538
Va.	61,665	35,730
W. Va.	79,012	30,988
N. C.	59,363	56,880
S. C.	34,774	34,020
Ga.	80,949	69,750
Fla.	65,739	65,739
Ala.	57,270	55,320
Miss.	37,404	37,404
La.	98,725	50,400
Texas	59,290	41,855
Okla.	20,592	16,470
Ohio	13,270	7,261
Ind.	11,545	7,560
Ky.	20,850	19,080
Tenn.	27,590	24,960
Mont.	70,571	28,705
Idaho (North)	274,894	61,141
S. Dak.	4,159	1,125
N. Mex.	6,395	2,413
Idaho (South)	16,780	4,900
Calif.	603,642	161,298
Nev.	5,981	1,220
Hawaii	3,718	466
Wash.	389,702	105,503
Oreg.	315,576	98,392
Mich.	449,788	123,390
Wis.	404,225	47,453
Minn.	292,427	94,493
	<hr/> \$5,034,520	<hr/> \$1,572,538





## REVIEWS



*Edited by Dr. Henry Schmitz, University of Minnesota, St. Paul, Minn.*

**Cattle.** By William MacLeod Raine and Will C. Barnes. *Pa. 340, Doubleday, Doran & Co., New York. 1930. \$2.00.*

The Epic of the Cowboy, by Raine, the author of some 35 novels of the Old West, and Will C. Barnes, former cowman, sheepman, secretary of the livestock sanitary boards of Arizona and New Mexico, member of the territorial legislatures of Arizona and New Mexico, with the U. S. Army in Indian Campaigns in Arizona, winning the Congressional Medal of Honor, grazing expert in the U. S. Forest Service from 1907 to 1928, later secretary of the United States Geographic Board, and author of several books on livestock, western ranges, ranch stories, and a forthcoming history of Arizona, retiring from government service in 1930, and now on a trip around the world.

This book is "the story of the greatest pastoral movement the world has ever known," and probably no two better writers in America could have been found to write it than Raine and Barnes. As a historical and economic document alone on the origin, growth and present status of the cattle industry of the Far West, it is invaluable. It is more than a history; it is a romance of high adventure, of fierce struggles, of killing and hard riding and cunning, of strong men and as picturesque as any that ever rode across the Western

scene. There are also high qualities of manhood, hardihood, personal bravery, shrewd business sense, and friendships, out of all of which the present cattle business west of the Mississippi has evolved. Livestock wars, range feuds, the Chisolm trail, cow towns, bad men, gun men, daring sheriffs, Texas Rangers, Indians, the Army, and finally the forest rangers, are all in this book.

The authors deplore the modern critics who mourn of

"the Man on Horseback, who has ridden through the sunset into yesterday's seven thousand years."

They tell us that

"the mustang he rode is a vanishing species. Dust covers his rotting saddle. In Phoenix the talk is of cotton and not cows; in Denver of oil and the Trans-Mississippi golf championship; in San Antonio of climate and dude ranches."

The authors hold that the romance of the old time cattle business has evolved into grazing as a *business*. And yet

"never in the history of the world has there been a phase of life comparable to that which existed in cattle-land within the memory of those of us not yet old. It was unique. It has had no parallel and can never have one. Because it *was*, the West *is*."

While the bringing of the first cattle and horses to America by Coronado in 1540, as well as the arrival of horses in Virginia in 1609 and of cattle in South Carolina in 1630,

are recorded as historical events, the book deals primarily with all the high adventure of the development of the cattle business in the West from immediately after the Civil War up to the present.

The coming of the forest reserves is recorded and the effect on the cowmen and their reactions to governmental regulation of the mountain ranges by the early-day forest rangers and forest supervisors recruited largely from Western men who knew cattle and the range. Having done their work, these early forest pioneers gradually gave way.

"The boys now coming from the forest schools may know comparatively little about the merits of a double rig saddle, how to make sourdough bread, rope a calf, or dip sheep. On the other hand, they know all about trees, plants, and their forage values, and the effect of erosion on denuded mountain sides. What they lack of practical range experience can be secured as apprentices right on the ground under the keen eye and friendly guidance of a competent, experienced forest ranger."

Due credit is given the Forest Service for its part in straightening out range controversies, for an equitable division of range, and for bringing scientific range management into the West.

"Damming and directing the flow of the cattle tide, the Forestry Service has helped to change it from a turbulent flood to a placid stream, and has been a factor in transforming the cattle trade from an uncertain adventure to a business dominated by the laws of supply and demand."

The book has thirteen chapters with a two-part appendix one of which deals with enemies of range cattle, an index, and 26 photographic illustra-

tions. It is a most readable book, an invaluable book, one which every American should read, whether he be a forester or a bond salesman!

JOHN D. GUTHRIE,  
U. S. Forest Service



**Now We're Logging.** By Paul Hosmer. Foreword by Stewart H. Holbrook. *Metropolitan Press, Graphic Arts Bldg., Portland, Oregon, 1931. \$2.00.*

This is a 210-page book giving a picture of pine logging and loggers of Eastern Oregon, a book with much humor and wit, drama and characterizations. It should be in every well-read forester's library. It should be there because it shows that humor can be found in the lumber business even in these depressed times; and secondly, because a reading of the book might help foresters to realize that life and work in the forests isn't all seriousness. The book has fifteen chapters of character sketches of men who get out the western yellow pine logs, those who saw them into boards, and those who then have to sell the boards. Such interesting characters as the general manager, the logging superintendent, the camp cook, the sawmill foreman, the student lumberman, and last, but not least, the forester, are a few of the characters pictured. A reading of the several chapters in which the forester figures may be both enlightening and heartening to hard-boiled rangers, scalers and foresters who mark trees and scale logs, and especially to those higher-ups who get the purchaser's name on the dotted

line of a 25-page, closely printed timber sale contract.

Of the logging superintendent, the author says he hasn't much to distract him "except the Forest Service, which is the second of his secret sorrows." Also, "from the Superintendent's viewpoint it is more or less discouraging to move into Section 14 with six newly purchased "cats" only to discover that the Forest Service does not allow caterpillar logging on that section." And then there is brush disposal on government timber sales: "As soon as the logs are off, the Superintendent has to put in a crew of expert gardeners, fancy hairdressers and manicurists to carefully rake the ground, pile the brush neatly and sweep up all debris with a broom and a dustpan, after which a crew of firemen burn the slashings on certain hours, days and weeks of the calendar as designated by the government."

The district ranger is here also, with a very amusing but life-like picture of that old pastime of hunting his horses, of an early and wet morning, in the mountains. And what ranger has not done this?

And as for government reports and ranger plans—well, the author writes almost as if he had once been a forest ranger, and that not so long ago, either!

The book is witty and humorous, has much truth in it, is very readable, and will provoke a laugh even in a super-scientist or a hard-worked forest ranger.

JOHN D. GUTHRIE,  
*U. S. Forest Service.*

### **Important Western Browse Plants.**

By William A. Dayton. *Bulletin*  
101, U. S. Dept. of Agri. July,  
1931. Pp. 214, Fig. 45.

The title of the bulletin is well selected, for there are indeed many important browse plants. Foresters, land owners, and others have real need for authoritative information concerning the food value of browse vegetation for herbivora, and how such cover may best be maintained, particularly on important watersheds. The author, a taxonomic botanist and forest ecologist, is peculiarly well qualified to bring together in usable form, with the assistance of his Forest Service co-workers, covering a period of 22 years, this stupendous work.

The primary meaning of "browse" is shoots or sprouts, especially "of twigs and stems of woody plants, with their leaves, as cropped (browsed) more or less by domestic and wild animals." But it is pointed out that browse is also a generic term applied to shrubs, woody vines, or small trees, whether eaten by livestock or not. Accordingly the number of browse species in the United States is in the thousands. On the national forests alone 1,000 or more species have already been collected, embracing 225 genera and 68 families.

The ecological distribution of browse vegetation is from sea level to timber line, being most abundant at intermediate elevations where arborescent species grow sparsely. But they often occur so abundantly in desert regions as to give character to the landscape, evading or escaping drought through special leaf adaptations, defoliation at



critical periods, and in other ways. Some species endure high alkalinity, others salinity, whereas still others grow in mucky soils or in water-logged bogs. Thus the acreage occupied by browse is enormous. In California alone the sclerophyllous browse type, or chaparral, occupies thousands of acres at elevations immediately below the commercial timber belt. And even more extensive is the great sagebrush formation of the Great Basin and Rocky Mountain regions.

Ecologists have classified the browse types of the United States into various formations and associations, those of Shantz and Zon, of Harshberger, and of Clements being the most generally adopted.

Although browse vegetation does not afford as much or as high a quality of food for livestock as the graminaceous cover, it is enormously important on western ranges, especially during periods of drought. Because of the deeper and much more extensive root system, the annual yield of leafage and twigs of browse is less fluctuating than in the forage yield of grasses and other herbs. Browse species with bland juices are more likely to be cropped than those with acid, very bitter, or astringent sap. There are delicate chemical distinctions in bitterness, however, which cause animals to take or reject plant leafage. Moreover, the saline taste characteristic of so many browse species peculiar to alkaline habits, notably those of the goosefoot family, is generally agreeable to livestock.

The browse feed of the West is largely encompassed in some 24 fam-

ilies and 60 genera. Six families and about 17 genera include poisonous species. Nine plant families are of outstanding importance in their contribution of palatable browse plants—the rose family (Rosaceae), including as it does the mountain mahoganies and bitter brushes, being one of the most valuable. On the other hand, the legume family, so famous for its herbaceous forage plants, contributes little browse feed. Likewise the members of the heath family are of low palatability—indeed several species of azaleas, rhododendrons, Labrador tea, and various others are quite toxic and annually cause rather heavy losses among sheep.

The above introductory points are followed by an alphabetical arrangement of important genera under the respective families. Even the genera of the Pinaceae are discussed from the viewpoint of injury by browsing under conditions of overgrazing. In the discussion of a genus one or more so-called “key” species is discussed in some detail, with notes on its distribution. Following this, brief notes are given on other important western species.

Finally the browse plants are classified by miscellaneous uses or properties such as: Those with edible fruits, seeds, and nuts; those yielding latex (lac, rubber, sugar, etc.); ornamentals; poisonous species; and outstanding genera and species of habitat indicators. The illustrations are largely pen-and-ink drawings, all but two having been made by the well-known plant artist, Mrs. A. E. Hoyle. The literature cited is large and well selected.

One may truly say that this is an epoch-making publication in the world of browsedom. The publication might have been somewhat more useful had there been a fuller Table of Contents. The all too abbreviated contents, however, is largely offset by an elaborate Index—indeed a check list of the genera.

For those interested in browse vegetation chiefly as cover to prevent erosion the bulletin is likely to be disappointing, as it discusses soil binding characters, root system network, etc., only incidentally. Also less space is given to the life histories of important species than the reviewer had anticipated. There remains now the big task of determining the relative nutritive qualities of important species of the various broad types at different intervals during the browsing season, and the physiological reactions of these important plants to different seasons and intensities of use. That is a field which must enlist the interest of many scientific agencies. In the meantime *Important Western Browse Plants* will fill a long-felt need of foresters, range technicians, and stockmen.

ARTHUR W. SAMPSON,  
*University of California.*



**Aus der Biologie des Samentragens der Waldbaume. (The Biology of Seed Production by Forest Trees.)** By O. Hummel. *Zeitschrift für Forst-und Jagdwesen*, Vol. 62, No. 6, Pp. 365-371. 1930.

In 1914, Prof. S. Kurdiani published an article under this title in

“Sselskoje chosiaistwo i lessowodstwo” in the Russian language. Because the subject-matter is one which has been almost entirely overlooked and neglected in contemporary forest literature, Prof Hummel has taken it upon himself to once more present the results of Kurdiani’s investigations covering the effect of incomplete fertilization upon the physical and physiological character of the seed crop of forest trees.

To the reviewer, this article appears at a rather opportune time. For several years, seed source and seed production studies have occupied a prominent place in the investigative program of the Rocky Mountain Experiment Station. Much has been published in recent years pertaining to the more practical aspect of the seed source problem, as this lends itself to solution from the broad standpoint of provenance. Definite, but less rapid progress, is also being made in the more restricted spheres of forest genetics involving individual inheritance, selection, etc. So far as the reviewer is informed, little has been accomplished in studying the nature of the various factors and stimuli aside from those of purely genetic nature which are influential in determining the viability of tree seeds.

In recent investigations of the amount and periodicity of seed production by various indigenous conifers, the reviewer has been impressed by the complexity of the different physiological processes which enter into the general phenomena of fructification. To isolate these and interpret their individual contributions is a difficult task, quite the more so because of the

absence of any comprehensive literature to refer to for guidance. The fertilization process in pines, particularly, is not understood as it should be by foresters. In local studies, especial interest has been centered upon the problem of abortion in an effort to account for the typically excessive mortality in western yellow pine cone production. One cannot but be impressed by Nature's lavish expenditure of vegetative energy which accompanies this functional activity in this species. Perhaps there is nothing to be done about it, but the problem, nevertheless, is a challenge to the investigative instincts of the research-minded forester.

Kurdiani's disclosures tend to clarify in a limited way some of the darkness which encompasses the problem. Certainly, their practical value as they relate to an important phase of silvicultural activity are well worthy of attentive consideration. For this reason it is desired to present a fairly complete resumé of Hummel's paper.

Kurdiani's investigations showed that under conditions where fructification is prevented, the blossoms of many plants dry up and are shed while those of others develop and finally produce sterile fruit. This phenomena of fruit development without fertilization is termed "parthenocarp" (Parthenokarpie). A distinction is made between "vegetative" parthenocarp and "stimulative" parthenocarp by some investigators, but Kurdiani confined himself to a consideration of the former type.

Because of essential differences in the parthenocarpic development of the fruit of angiosperms and gymnosperms,

the term parthenocarp was applied to deciduous trees, while for conifers, Kurdiani coined the term "parthenospermy." In the parthenocarpic fruit of deciduous trees the unfertilized ovules die off without developing a seed shell. In conifers, on the other hand, quite often a seed coat is developed without fertilization. In some instances the sterile seeds may closely resemble normal seeds, while in others they may be quite dissimilar. In any case, the development of empty seed shells may be considered characteristic of most conifers.

Kurdiani distinguishes between three grades of parthenocarp and -spermy; complete, when the unfertilized flowers develop into fruit; partial, when only a part of the flowers develop thusly, and incipient, when the unfertilized flowers grow for a while then dry up and fall from the tree. He investigated 20 hardwoods, employing artificial pollination and castration to procure the results desired. He noted that the stigmas of fertilized and unfertilized blossoms wilted at various times. In some cases they remain green for considerable periods in anticipation of eventual pollination. Complete parthenocarp was noted in *Alnus glutinosa*. In fact, the development of 5 to 10 fertile seeds in isolated, unfertilized strobiles indicates that this species has the capacity for parthenogenesis.

The only reference previous to his own investigations concerning the parthenospermic development of cones and seed by conifers was found under the works of Von Kirchner who described yew (*Taxus*) as having this capacity. Kurdiani investigated nine



coniferous species and established their relative parthenospermic status. He found that effect of climatic conditions in inducing parthenospermic development is especially pronounced in the case of *Thuja occidentalis*. This tree blossoms early in March. Frequent spring frosts destroy the stamens, and wind and rain storms prevent normal pollination. The condition is especially prevalent in isolated trees.

*Larix europea* distinguishes itself by complete parthenospermy. The parthenocarpic cones do not fall and utilize a certain amount of reserve food material, according to the character of the seed year, which results in a decrease of wood increment and a delaying of the next seed year.

In his experiments, Kurdiani succeeded in crossing *Larix leptolepis* (male) with *Larix europea* (female). Fifty-five hybrids were obtained, which distinguished themselves from the parents by more rapid growth. They resembled *Larix leptolepis* very closely, especially as to length and color of new shoots and color of needles. They also inherited a pronounced immunity against *Chermes laricis*.

Conclusive results were not obtained with pine, because the new shoots in this genus are, as a rule, too tender to withstand the long shading to which they are subjected under experimentation and, as a result, the cones die off. Experiments in 1926 with *Pinus eldarica*, resulted in the production of normal cones in which no seed shells were to be found following inhibited fructification. In artificial pollination tests with this species, it was found that the degree of abnormal development varied in-

versely with the proximity of relationship between the crossed species.

His experiments led Kurdiani to conclude that from the standpoint of the forest, parthenocarp and parthenospermy must be considered as harmful and uneconomic. To develop a sterile fruit, reserve food material is used which otherwise would enter into the production of wood or formation of flower buds for the succeeding year. The degree of loss is greatest in species in which the process of fruit ripening continues from spring until late fall, since it delays the recurrence of another seed year.

Parthenocarp and parthenospermy occur most frequently in dioecious species. Isolated trees of unisexual flowering species, which as a rule are gregarious, like spruce, fir, pine, birch, and others, produce a large amount of parthenocarpic fruit. In these the distribution of staminate and pistillate flowers in such as to facilitate cross pollination over selfing. For this reason, conditions for fertilization are unfavorable for these species in mixed stands, while in pure, fully stocked stands, parthenocarp is of exceptional occurrence, and associated principally with unfavorable weather conditions or pollen sack injury by insects.

An antipathetic relationship exists between excessive light requirements and fertilization in intolerant species, like larch and birch, which have open crowns and rarely occur in pure stands. Low germinability, and a large percentage of hollow seed in these two species may be attributed to this condition. By the aid of artificial pollination, the germination percentage of

Larch seed was increased from 15 and 30 per cent to 80 per cent.

The conifers studied may be grouped as follows in regard to parthenospermy:

#### Group I. Complete.

a. Parthenospermic seed is difficult to distinguish from normal seed. Larch, fir, juniper.

b. Parthenospermic seed is easily distinguished from normal seed by weight, color and dimension. Spruce, pine.

#### Group II. Partial.

a. A portion of the inflorescence does not develop fully but also does not fall off. *Thuja occidentalis*.

b. A part of the inflorescence does not develop fully and falls away. *Thuja orientalis*.

#### Group III.

Parthenocarpic fruit is shed promptly. *Juniperus sabiniana*.

The following conclusions are presented for the practice:

1. In collecting seed from dioecious species, attention must be given to the proximity of staminate trees to the seed trees. If these are not present, most of the seed will be sterile.

2. To correctly evaluate a seed crop it is necessary to have a knowledge of meteorological conditions and the occurrence of stamen-destroying insects. The presence of a large amount of parthenocarpic fruit tends to mark the absence of fertile seed.

3. While open-growing trees are subject to the best growing conditions (from a physiological standpoint) for the developing of a seed crop and are, as a rule, the easiest trees to collect from, it is better not to collect from such trees in the case of species like

spruce, pine, fir, etc., which depend upon cross pollination primarily, because there is danger of collecting a large amount of parthenocarpic seed.

J. ROESER, JR.,  
Rocky Mountain Forest  
Experiment Station.



**Forest Rangers' Catechism.** By R. W. Ayres, and Wallace I. Hutchinson. *U. S. Department of Agriculture Miscellaneous Publication No. 109. June, 1931. Pp. 48.*

Those foresters who had to attend parochial schools in their boyhood will not take kindly to the title of this new government publication. But if a catechism is solely a book of questions and answers intended to inform, and not, as the small boy would claim, his school catechism was foisted upon his defenseless self by well-meaning elders as a means to intimidate him and shorten his play hours, this catechism "goes over big." In fact the reviewer offers the opinion that Ayres and Hutchinson's Catechism has already been read more completely and referred to more frequently and generally in its young life than any other recent Forest Service publication. And this because it serves up a heavy meal in small installments as the consumer needs or wants and can assimilate them and because, further, both authors know how to be kind to the English language.

The Forest Rangers' Catechism contains over 200 questions and answers pertaining to all branches of forestry but principally to those forestry subjects as they apply to the national forests in California. They begin with ten questions under the general title "What are the National Forests?" followed by such departments as administration, personnel, revenues and expenditures. General ques-

tions on forest influences, water resources, etc., are particularly well chosen. Questions concerning agricultural lands, mining possibilities, recreation, and others so frequently put to forest officers, are answered. Forest fires, of course, come in for a goodly share of attention; for example, fire statistics, the fire prevention and protection agencies of the state, federal aid to the states, humidity, causes of fires, how fires are fought and the tools required, airplane patrols, the use of fire breaks and backfiring, and others. As one would expect of a California author, "light burning" is given separate and special treatment, and this is so well done in a few well worded sentences as to be particularly informing and illuminating on this vexing question. Forest research, public relations, parks, etc., also receive their due share of attention. Most of the answers could not be improved upon in a text book.

The Forest Rangers' Catechism is like the sample scenes from a good motion picture. It makes one want more. Good as the present effort is it falls (now that we know that forestry can be treated catechismically) far short of what it ought to be. The 230 questions should be expanded to 500. In reading over the booklet the reviewer has thought of several dozen questions that should be added and he will pass them on to the authors. No doubt the authors would welcome similar treatment from other readers.

All in all this is one of the most useful publications in forestry yet produced when one considers that forestry tenets have not yet been fully enough accepted by the public. It is a real "public relations" effort. The public *wants* to be informed and it finds forestry information particularly pleasurable and satisfying—like a tramp through the woods. It cannot get this information in the stilted, heavy, often dogmatic publications that

have followed one another with such dizzy speed in the last decade. Let us have a bigger Forest Rangers' Catechism and let it cover not only one state but all.

EMANUEL FRITZ,  
*University of California.*



**Mitteilungen aus der Staatsforstverwaltung Bayerne (Contributions from the State Forest Administration of Bavaria).** *State Ministry of Finance, Munich, G. J. Manz 1930. Pp. 105. Price 4 marks.*

This is No. 21 in the post-war series of Bavarian official publications on forestry. It consists of two interesting articles. The first by Oberforstmeister Wopfner describes the cyclonic windfall of 1920 in the forest of Breienthal (spruce) and the subsequent work of reforestation by planting. This windfall catastrophe may be likened to the one which befell the Olympic Peninsula in recent years.

The second contribution is a thorough going history of the Ebersberger forest by Dr. Kurt Mantel. It bears the subtitle "eine historisch — Kritische Studie des Holzartenwechsels auf der Muenchener Schottesebene" that is a study of changes in composition on the diluvial plains outside of Munich. This is of particular interest to students of silviculture and of forest management as it reveals the attempts at natural regeneration of hardwoods (1650-1800) the subsequent trend towards pure conifers and the present policy of mixed forests.

A. B. RECKNAGEL,  
*Cornell University.*



**Untersuchungen ueber *Pinus peuce* and *Pinus leucodermis* in ihren bulgarischen Wuchsgebieten (Investigations on Two Bulgarian Pines).** By Karl Maximilian Mueller, Munich, Geibelstr. 2, 1931. Pp. 27.

These are silvical notes on two little-known pines in the Balkans. *Pinus peuce* is an important timber tree in the Rila mountains; *P. leucodermis* an almost vanishing species akin to our own white-barked pines of the high western mountains.

A. B. RECKNAGEL,  
Cornell University.



**Die Ebersberger Waldordnung aus dem 13ten Jahrhundert (Thirteenth Century Forest Laws).** Dr. Kurt Mantel, Berlin, Paul Parey, 1931. Pp. 31.

To students of forestry and of the development of forest law, this brochure will appeal as authentic material. It presents a picture of forestry in its earliest developments on an economic plane of locally sustained yield with the motivating fear of an imminent fuel famine. Such material is scarce and hard to get at—the author deserves great praise for his research in ancient documents.

A. B. RECKNAGEL,  
Cornell University.



**Sapinieres: Le Jardinage par Contenance. (Silver Fir Stands: The Selection System with Control by Volume.)** By A. Schaeffer, A. Gazin, and A. d'Alverny. *Les Presses Universitaires de France.* 1930.

The title of this book may be translated "Silver Fir Stands: the Selection

System with Control by Volume." It is written by three members, past and present, of the Département des Eaux et Forêts, as a memorial to the late M. de Liocourt, a distinguished French forester who did much to develop the method described.

The object of the method, as is explained in Chapter 1, is to apply the selection system with volume control to uneven-aged and many-storied mixtures of silver fir, spruce, and beech that have been opened up and are in a continual state of reproduction. The silvicultural procedure laid down is a succession of frequent light cuts in which the better stems are retained and the worse removed by means of an individual selection in each diameter class. There is no rotation and no exploitation age is fixed beforehand, every tree becoming exploitable when it interferes with one better than itself or shows signs of dying. The amount of the cut is regulated by the production actually found from comparison of periodical inventories.

In Chapter 2 follows a description of the several operations involved in the use of the method, namely: division of the area into administrative units, control calculations, decision as to volume to be cut, decision as to length of felling cycle, regulation of marking and felling, application of correction factor to measurements, bookkeeping, and revision of working-plan prescriptions. The whole of this chapter is written in terms that are designed to be intelligible to all forest owners, whether trained in forestry or not, while Chapter 3, which gives detailed examples illustrating certain finer developments of the method, is written solely for technical men. The reader is advised to go through this chapter "pencil in hand," and apply the calculations in due course to examples taken from his own forest.

Chapter 4 discusses the policy of cultural operations, which is to be based on a detailed calculation of increment,

the time taken to pass through the diameter classes, correction factors and curves. The section describing the use of frequency curves as a means of checking the normality or abnormality of the diameter-class distribution is most interesting, and the warning against hasty revisions of silvicultural policy on the strength of insufficiently analysed increment calculations is also worthy of attention.

Chapter 5 is devoted to management policy and defines the ideal object of the control method as being the attainment of the yield of maximum value with the minimum accumulation of material required to ensure permanence. The authors point out that there are two ideas involved in this definition, namely that of the permanence of the stand and that of a maximum financial revenue, and they proceed to discuss these successively at some length. The forester's landmarks in his approach to permanence, or "equilibrium," in the stand are stated to be continuous regeneration, proper density, regular progress through the diameter classes, proper proportion between the diameter classes, and a correct point of exploitability as shown by the termination of the stand-composition curve, or "curve of equilibrium." Passing then to the financial problem of calculating the point of economic exploitability, they first remark that, as large sound trees normally pay at least as well as others, one may argue that there should be no point of exploitability in a selection forest other than that determined by the fertility of the station; and this point does not have to be found by calculation but by the observation of facts. However, market conditions may upset the basis of this argument, and it then becomes necessary to fix the age of exploitation arbitrarily; the remainder of the chapter discusses how this entails the construction of an artificial curve of equilibrium ending at the point chosen, and

giving correspondingly different values for the younger portions of the stand. The forester's problem then becomes one of directing the growth of the whole stand in accordance with this artificial curve.

The authors state in their introduction that the system has been used for many years in several forests, some of which are of considerable size, but to the North American reader it seems little short of miraculous that such intensive work can be habitually undertaken and such ingenious calculations regularly employed in commercial operations.

We fear that the book, though of considerable theoretic interest, can hardly be of very much practical importance to the profession on this side of the water.

A. GRAHAM,  
*Quebec Forest Industries Assoc.,*  
*Quebec.*



**A Traverse les Forêts de Pinsapo d'Andalousie. Etude de Dendrologie, de Sylviculture & d'Entomologie Forestiere. (Across the Pinsapo Forests of Andalusia.)**  
By A. Barbey. *Librairie Agricola de la Marson Rustique, Paris.* Pp. 108, plates 41. 1931.

In preparing this book, M. Barbey, according to the statement which he makes in the introduction, was fulfilling a three-fold purpose: (1) to honor his grandfather who was the first to describe the pinsapo almost a hundred years ago; (2) to enjoy a trip into the rich botanical fields of Spain; and (3) to gather some scientific data on the silvics and insects of the fir forests of Andalusia.

He accomplishes the first by a very charming description of the life and activities of his grandfather, Edmond Boissier. That he accomplished the second is well evidenced by his enthusiastic account of his travels and adventures. As proof

of his third purpose, he presents quite complete dendrological, silvical and entomological data in regard to the pinsapo and its associate, the alpine oak.

The pinsapo is described as a fir growing in a rather restricted area of about 3,000 acres in the higher mountains of Andalusia. It has shown itself to be capable of quite large and rapid growth under favorable conditions, but here in its mountain home, misused by man and badly handicapped by the grazing of sheep and goats, it is, for the most part, stunted and decreasing in area. The author also describes some two score insects which are damaging the trees more or less.

In his conclusions he points out the overwhelming odds against which this tree is working, and urges its preservation through proper grazing regulations and proper silvicultural measures.

The queer melange of eulogy, travel notes and scientific data is hard for an American to understand. It is also hard for him, accustomed as he is to literally hundreds of species, to realize the importance of saving except in the aboreta of the country such a remnant of an apparently unsuccessful species.

However, the pinsapo may have greater possibilities than we think, and at least Mr. Barbey has given us a very interesting little book.

E. G. CHEYNEY,  
*University of Minnesota.*



### **The Evergreen Forests of Liberia.**

By G. Proctor Cooper and Samuel J. Record. *Yale University: School of Forestry Bulletin No. 31. 1931. Pp. 153. \$1.00.*

This is a publication of considerable scientific and commercial value concerning the timbers of a limited and comparatively little known region. Publica-

tions of this kind are sorely needed for all of the forest regions of the world which have not yet been exploited except superficially. Already we have obtained many kinds of woods from tropical forests but there are many others which would serve our purposes very well if we but knew them better. The present bulletin is in the nature of a report on investigations made in Liberia on lands being cleared by the Firestone Plantations Company for rubber plantations. The clearing operations required the removal of the forest from many thousands of acres and at the same time made it possible to obtain study material and also more knowledge of the composition of the forest. It is to the lasting credit of the Firestone Company that it permitted the Yale Forest School to conduct the studies and lent its coöperation. According to the junior author "the Yale-Firestone coöperative study was largely from the standpoint of the forester and wood technologist and had in view the practical as well as the scientific aspects of the situation. Trees, because of the difficulty they offer to the collector of botanical specimens, are very likely to be the least well known of plants. This is a serious handicap to the forester and one that, under ordinary circumstances, is very slowly overcome. In the present instance, however, large blocks of forest were being felled, thus making it possible to obtain samples of every tree in the stand, though of course not all were in flower or fruit. Nearly 500 specimens were obtained, representing 300 species, 222 genera, and 68 families; at least 18 species have proved new to science. No attempt was made toward a general collection, and the few herbs included were incidental to the forest survey."

Fancy wood commerce is already dealing with woods that have attained some



fame, but oddly enough no one can say definitely to what tree species some of them belong. Doubtless the tree species are already classified but there is no co-ordination between the tree species and the commercial wood. Botanists have too frequently failed to collect wood with their leaf, flower, and fruit material. This is a very serious handicap which present-day wood technologists interested in tropical woods have to overcome. Due to the efforts of Professor Record and a few others, botanical collections made in the tropics at the present time are made to include woody material from the trunks of the trees. This was done in the case of the Liberian collections.

The forests of Liberia are largely of the jungle type. The trees are principally evergreens—hardwoods and palms. The large number of species present on limited areas indicates the complexity of the forest type.

In the first few pages the authors give some general notes on the region and its forests, while the great bulk of the publication is devoted to descriptions of species arranged by families. The descriptions include, where information is available, notes on tree characteristics such as size, foliage, fruit, etc., and more detailed descriptions of the wood, including in most cases notes on the microscopic features. The tables give the results of studies on 52 sample plots to determine composition by species, numbers, and diameter classes. Other tables give the mechanical properties of a large number of the woods that were collected in sufficient quantity for mechanical tests. An all too brief part gives a list of the uses to which the more abundant woods appear to be suited. This is the part of greatest interest to commerce. The bulletin closes with a check list giving botanical, commercial, and native names. The 15 plates illustrate largely the foliage

and fruit characteristics of some of the trees and some forest views.

EMANUEL FRITZ,  
*University of California.*



**Tree Planting on the Farm.** By R. H. Anderson. *Dept. of Agric. New South Wales. Farmers Bull. 167. 1931.*

Most of the phases of tree planting on New South Wales farms are covered concisely and interestingly in this publication. The discussions are grouped under the following headings: The Uses of Trees on Farm and Pastoral Areas, Principles of Tree Planting, Improvement and Regeneration of Naturally Occurring Trees, The Establishment of Windbreaks and Shelter Belts, The Farm Tree-plot, Species Recommended for Various Districts.

It appears that the principal purposes in planting trees on farms in Australia are quite similar to those in our own farming sections. Windbreaks, shelterbelts, timber, fuel, and protection from erosion are important needs. The planting of trees to produce fodder during periods of drought, to serve as bee trees and to enrich the soil are other needs mentioned.

In discussing one of the advantages of windbreaks, the publication brings out the interesting claim that "reduction in the evaporation is around 30 per cent., the moisture retained in the soil being available for crop needs. The actual result of a windbreak in reducing evaporation is therefore equivalent to a fairly large increase in rainfall." Careful consideration is given to the choice of species, preparation of ground, planting and to the nursery practices involved in growing seedlings on the farm. The three ways the land owner can obtain seedlings are: growing them in a small nursery,

purchasing from nurserymen, and transplanting seedlings "from nearby bush" with probably the strongest emphasis on the first practice.

It is interesting to note that the best season for planting is from May to August which is termed "the resting period," "with moist cool conditions prevailing." Among the several methods of planting recommended the tube method practiced extensively in India and Southern Australia is discussed. "Tubes about 4 inches long are cut from bamboo or common reed, filled with soil, sown with 2 or 3 seeds, and after the seedling has developed under nursery conditions, planted out tube and all." Direct seeding in the field is not generally advised as a practice for private land owners, as it appears to involve too many risks.

It is shown that planted trees must be protected from livestock by the erection of "stock-proof" fences. Protection from fire is also regarded as essential but this is not considered a great risk on the farm if a small amount of attention is given.

Establishment of a "farm tree-lot" or in other words the growing of timber for the market, is mentioned as an operation with profit possibilities. The planting of softwood trees offers best oppor-

tunities as softwood timber is much in demand for building purposes. Although Australia is considered rich in hardwoods, about 80 per cent of the timber demand is for softwood. Softwoods valued at about  $1\frac{1}{2}$  million pounds sterling annually are imported into New South Wales. With this situation existing, there should be an excellent market for home-grown softwood timber.

The last 7 pages list the species of trees to plant in the 4 different districts of New South Wales namely, The Western Plains, Western Slopes Division, The Tableland Division, and The Coastal Division. Under these district headings are the following subheads with the recommended species under each, "Trees for Shade and Shelter," "Trees for Windbreaks and Shelterbelts," "Hardwood Timber Trees," "Softwood Timber Trees," "Trees for Fuel." Most of the species listed are probably native in Australia, however a few of the trees are recognized as being either native or introduced in America. Some of these are Chinese elm, pin oak, sweet gum, pecan, plane tree, honey locust, horse chestnut, Osage orange, and western yellow pine.

W. K. WILLIAMS,

*Extension Service,*

*U. S. Department of Agriculture.*



## SOCIETY AFFAIRS



### PERSONALS

Joseph Kittredge, Jr., of the Lake States Forest Experiment Station, has resigned, effective December 31, to accept a position as professor of forest influence at the University of California. This is the first position of this kind to be established at a forest school in the United States and shows the importance that California attaches to the part forestry plays in the social and economic life of a community. Kittredge obtained his doctorate from the University of Minnesota last July.

P. M. Barr temporarily goes to the University of California as lecturer, for the spring semester, in forestry and forest mensuration.

S. B. Locke, Assistant Biologist of the Biological Survey assigned to the Inter-mountain Forest and Range Experiment Station, has accepted the position of Conservation Director of the Izaak Walton League of America.



### SOCIETY EMBLEMS

Society pins may be obtained from the Society's office, Hill Building, Washington, D. C., for Fellow, Senior, Junior and Associate grades of membership. The cost is \$2.00 each.

The pin is shield-shaped and is of 10k gold. It is lettered in gold on a green enamel background, surrounded by a gold border for Fellows and Senior members or a white enamel border for Junior members. Associate member pins are the same as Senior member, except that the background is brown.

### PACIFIC SCIENCE CONGRESS POSTPONED

The Canadian National Research Council has announced that on account of the disturbed conditions prevailing throughout the world the Government of Canada has deemed it best to postpone for a year the Fifth Pacific Science Congress, which was to have been held under the council's auspices May 23-June 4, 1932, in Victoria and Vancouver, British Columbia.

### FORTHCOMING EVENTS

Drainage, Conservation & Flood  
Control Congress  
February 17-19, 1932  
Louisville, Ky.

Forest Management Conference of Private  
and Official Pacific Coast Agencies and Annual  
Meeting Western Forestry and Conservation  
Association.  
Portland, Ore.  
March 7-9, 1932.

Allegheny Section  
Annual Winter Meeting  
Baltimore, Md.  
February 26-27, 1932

*Section secretaries are welcome to use this box for announcing their meetings. Copy should be in the hands of the Editor or Executive Secretary one month before date of publication.*



## ANNOUNCEMENT OF CANDIDATES FOR MEMBERSHIP

The following names of candidates for membership are referred to Junior Members, Senior Members and Fellows for comment or protest. The list includes all nominations received since the publication of the list in the January JOURNAL, without question as to eligibility; the names have not been passed upon by the Council. Important information regarding the qualifications of any candidate, which will enable the Council to take final action with a knowledge of essential facts, should be submitted before March 15, 1932. Statements on different men should be submitted on different sheets. Communications relating to candidates are considered by the Council as strictly confidential.

## FOR ELECTION TO GRADE OF JUNIOR MEMBER

<i>Name and Education</i>	<i>Title and Address</i>	<i>Proposed by</i>
Arnold, Fred H. N. Y. S. College of Forestry, B. S., '28.	Graduate Student, New York State College of Forestry, Syracuse, N. Y.	New York Section
Bachman, Earl E. Mich. State, B. S. F., '25.	Assistant Forest Supervisor, Nevada City, Calif.	California Section
Balthis, Russel F. Iowa State, B. S. A., '07; Colo. State Agric., M. S., '27. (For Reinstatement).	Assistant State Forester, Texas Forest Service, College Station, Tex.	Gulf States Section
Bedard, W. D. N. Y. S. College of Forestry, B. S., '29; M. S., '30; 1 yr. towards Ph. D. at U. of Mich.	Assistant Entomologist, Forest Insect Field Station, Coeur d'Alene, Idaho.	North. Rocky Mtn. Sec.
Caulkins, John G. N. Y. S. College of Forestry, B. S. F., '26.	Assistant Forest Engineer, 1030 Canada Cement Bldg., Montreal, P. Q.	New York Section
Curtiss, Richmond H. U. of Vermont, B. S., '29; Yale, M. F., '30.	State Park Board, New Haven, Conn.	New England Section
Fischer, George A. Dept. Forest & Range, Wash. State, B. S., '31.	District Ranger, Eagle District, Whitman N. F., Medical Springs, Ore.	North Pacific Section
Flynn, Horace F. U. of Maine, B. S. F., '31.	Graduate Fellow, N. Y. State College of Forestry, Syracuse, N. Y.	New York Section
Fortin, John Broughton N. Y. S. College of Forestry, B. S., '31.	Graduate Student, N. Y. State College of Forestry, Syracuse, N. Y.	New York Section
Garin, George I. Licence Russi a Paris, degree '22; U. of Idaho, B. S. F., '29; M. S. F., '30.	Forest Ranger, Flathead Agency, Dixon, Mont.	North. Rocky Mtn. Sec.
Grogan, William W. U. of Wash., B. S. F., '29.	Forestry Examiner, Weyerhaeuser Logged Off Land Co., Tacoma, Wash.	North Pacific Section
Gustin, Harold Erford N. Y. S. College of Forestry, B. S., '30.	Graduate Assistant, New York State College of Forestry, Syracuse, N. Y.	New York Section
Haischer, Carl E. N. Y. S. College of Forestry, B. S., '31.	Fellowship Student, New York State College of Forestry, Syracuse, N. Y.	New York Section
Hanson, Nathaniel B. Iowa State, B. S. F., '29.	Senior Forest Ranger, Rosebud Reservation, S. D.	North. Rocky Mtn. Sec.
Hillgartner, Gordon G. N. Y. S. College of Forestry, B. S. F., '29.	Assistant Forester, New Jersey State Forest, Branchville, N. J.	Allegheny Section
Hormay, August Ludwig U. of Calif., B. S. F., '30.	Junior Range Examiner, Calif. For. Exp. Station, San Francisco, Calif.	California Section

## FOR ELECTION TO GRADE OF JUNIOR MEMBER

<i>Name and Education</i>	<i>Title and Address</i>	<i>Proposed by</i>
Jemison, George M. U. of Idaho, B. S. F., '29.	Junior Forester, Northern Rocky Mtn. Forest & Range Exp. Station, Missoula, Mont.	North. Rocky Mtn. Sec.
Johnson, Fred T. Colo. Agric. College, B. S. F., '27.	Forest Assistant, Yellowstone National Park, Wyoming.	North. Rocky Mtn. Sec.
Kienholz, A. Raymond North Central College, B. S., '17; U. of Ill., M. S., '20, Ph. D., '22.	Physiologist and Ecologist in Forestry, Conn. Agric. Exp. Sta., New Haven, Conn.	New England Section
King, George E. Grammar School.	District Forest Ranger, Donmiville District, Tahoe N. F., Goodyear Bar, Calif.	California Section
Land, F. A. Grammar School.	District Ranger, Sierraville District, Tahoe N. F., Sierraville, Calif.	California Section
LeBarron, Russell K. U. of Idaho, B. S. F., '31.	Junior Forester, Ely, Minn.	Minnesota Section
McCaslin, Frank High School.	Senior District Ranger, Bloomfield Ranger District, Tahoe N. F., North Bloomfield, Calif.	California Section
McWilliams, James P. Penn State, B. S. F., '30.	Field Assistant, Maryland Dept. of Forestry, Salisbury, Md.	Allegheny Section
Meggers, Frank W. High School, Feather River Training School, F. S.	District Ranger, Camptonville Dist., Tahoe N. F., Camptonville, Calif.	California Section
Meyer, Leo W. U. of Calif., B. S., '14; Yale, M. F., '17.	Forest Engineer, Mills Bldg., San Francisco, Calif.	California Section
Nace, William W. Penn State, B. S. F., '28.	Assistant District Forester, Pa. Dept. of Forests and Waters, Petersburg, Pa.	Allegheny Section
Nyce, George M. High School; 1 yr. Yale Summer School.	Senior Ranger, U. S. Indian Forest Service, Plummer, Idaho.	North. Rocky Mtn. Sec.
Parsons, Bert E. Leavitt Institute.	Principal Forest Ranger, Stanislaus N. F., Sonora, Calif.	California Section
Pond, James Dunbar Cornell U., B. S. F., '28.	4-H Club Agent, also in charge of County Forest, Farm Bureau, Fort Edward, N. Y.	New York Section
Risch, Lucius J., Jr. Iowa State, 1 yr.; La. State, B. S. F.	Graduate Student, Munich, Germany.	Gulf States Section
Sweeney, M. J. U. of Mich., A. B.; M. F., '11. (For Reinstatement.)	General Manager, American Timber Co., Denver, Colo.	Cent. Rocky Mtn. Sec.

## FOR ELECTION TO SENIOR MEMBERSHIP

Horning, W. H. Penn State, B. S. F., '14; U. of Calif., M. S. F., '28. (Junior Member 1923.)	Assistant Professor of Forestry, Iowa State College, Ames, Iowa.	Minnesota Section
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## FOR ELECTION TO ASSOCIATE MEMBERSHIP

Scattergood, J. Henry Haverford, A. B., '96; Harvard, A. B., '97.	Assistant Commissioner, Office of Indian Affairs, Dept. of Interior, Washington, D. C.	Washington Section Minnesota Section North Pacific Section Southwestern Section
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C. F. KORSTIAN,

*Member of Council in Charge of Admissions.*

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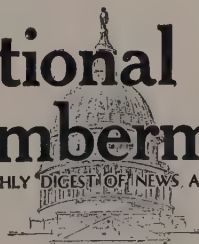
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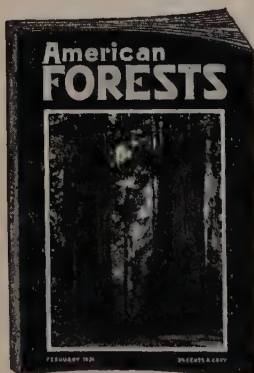
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